K08-362

INVITATION TO BID
CITY OF NEW ORLEANS

BID PROPOSAL NO. 500C-00435
PROJECT NO. 2008-TRAF-01
SCHOOL FLASHING BEACON SYSTEM
REPAIR AND REPLACEMENT
CITYWIDE

ATTACHMENT "A"

BID SPECIFICATIONS

1. GENERAL SPECIFICATIONS

   a. The City of New Orleans ("City") solicits bids to obtain a requirements contract for **SCHOOL FLASHING BEACON SYSTEM REPAIR AND REPLACEMENT CITYWIDE.**

   b. Contractors must receive an approved purchase order from the City of New Orleans Department of Finance Purchasing Bureau prior to beginning all work or acceptance and processing of all orders. Only Purchasing Agent or authorized deputies have authority to place orders chargeable to city funds. Contractor may contact Department personnel listed on the purchase order to verify the authorization of the employee placing the call.

   c. Claims against the City of New Orleans are payable only on invoices, reference City of New Orleans purchase order number, rendered to Bureau of Accounting, Room 3W02, City Hall, 1300 Perdido St., New Orleans, LA 70112

   d. City reserves the right to cancel purchase orders within a reasonable period after issuance. Should a purchase order be canceled, the City agrees to reimburse the Contractor for actual and documented costs incurred by the Contractor pursuant to the purchase order. The City will not reimburse the Contractor for any costs incurred after receipt of cancellation, or for lost profits, or performance of services prior to issuance of a purchase order.

   e. Contractor agrees to accept verbal cancellation of purchase orders.

2. **GENERAL REQUIREMENTS**

   A. STAKES AND MONUMENTS

   All work must accurately conform to lines, grade, plans and sections furnished. The authorized engineering representative of the Traffic Engineering Division, Department of Public Works, City of New Orleans hereinafter referred to as the Engineer, will furnish the bench marks and control base lines necessary for layout of the project. The Contractor shall furnish at his own expense the lines and grades necessary for competent, skilled workmen to lay out and complete the work according to the plans and specifications.

The Contractor shall furnish at his own expense the necessary help, including engineering assistance, required in setting the stakes to define the line and grades. All stakes, grade boards, etc., as above required, shall be supplied by the Contractor at his own expense. The Contractor must also employ competent and skilled men and furnish the necessary forms, lines, engineering survey instruments, spirit levels, stakes and other tools, equipment and materials to correctly lay out the project in accordance with the plans and specifications and directions of the Engineer.

B. COORDINATION OF WORK WITH UTILITY COMPANIES

It shall be the responsibility of the Contractor to locate and avoid all underground obstacles. All companies with utilities in the area must be contacted prior to beginning work.

C. TRAFFIC ACCOMMODATIONS

Unless otherwise directed or amended herein, the Contractor shall comply with the traffic provision requirements of Section C713 of the General Specifications and the plans. Refer also to Part VI of the Manual on Uniform Traffic Control Devices, U.S. Department of Transportation, FHWA and State of Louisiana.

The Contractor shall prepare and submit to the Project Engineer his work schedule prior to issuance of work order.

The Contractor shall be responsible for furnishing, at no cost to the City, all signs required to alert vehicles and pedestrians of the work in progress and parking restrictions during working hours.

D. HIGH EARLY STRENGTH CONCRETE FOR ROADWAY

Concrete shall be in accordance with Section C601 of the General Specifications, except that additional cement shall be added to produce the normal seven (7) day strengths within seventy-two (72) hours.

E. PROJECT TIME

The work shall be completed in all details and ready for final acceptance within 120 calendar days of issuance of the notice to proceed. An extension shall be granted when, in the opinion of the Engineer, factors beyond the contractor's control warrant such an extension.

F. WORK ORDER

The Contractor shall anticipate the immediate issuance of a work order upon award of the contract. Contractor shall start work within 10 working days upon receipt of a the notice to proceed.

G. REMOVAL OF EXISTING PAVEMENT

The Contractor shall remove and dispose of all reinforced concrete and asphalt pavement within the limits of removal shown on the plans or as directed by the Engineer.

The Contractor shall saw cut the existing pavement as shown in the plans to insure a straight and smooth joint for construction of the pavement extension or new curb.

Payment shall be made at the contract unit price bid per square yard, Item, "Removal of Existing Portland Cement Concrete Pavement," which price shall be full compensation for all labor, equipment, materials and necessary appurtenances required to complete the removal. No separate payment shall be made for saw cuts.

H. REMOVAL OF CONCRETE CURB

The Contractor shall remove and dispose of the reinforced concrete curb within the limits shown on the plans for as directed by the Engineer.

The Contractor shall saw cut the curb and pavement as shown on the typical section plan sheet of the drawings.

Payment shall be at the contract unit price bid per linear foot, Item, "Removal of Existing Curb", which price shall be full compensation for all labor, equipment and materials required for complete removal. No separate payment shall be made for saw cuts.

I. EXCAVATION AND BACKFILLING

The excavations required for the installation of conduit, foundations and other appliances shall be performed in such manner as to cause the least damage to streets, sidewalks and other improvements. Trenches shall not be excavated wider than necessary for proper installation of electrical appliances and/or foundations. Excavating shall not be performed until immediately before installation of conduit and other appliances. Material from the excavation shall be so placed as to cause the least disruption and obstruction to vehicular and pedestrian traffic and the least interference with surface drainage.

Excavation within street area shall be backfilled with concrete as shown on plans. All other excavations shall be backfilled with suitable material as shown on plans. Surplus excavation shall be removed and disposed of by the Contractor outside of the street right-of-way, in accordance with the Standard Specifications. Excavations, after backfilling, shall be kept filled and maintained in a smooth and well-drained condition until pavement repairs are made.

At the end of each day's work and at other times when construction operations are suspended, all equipment and other obstructions shall be removed from that portion of the roadway for use by public traffic.

Excavation in the street or highway shall be performed in such manner that not more than one traffic lane shall be restricted in either direction at any time. Traffic shall not be obstructed during hours of peak flow (7:00 to 9:00 A.M. and 4:00 to 6:00 P.M. or other hours designated by the Engineer) unless approved otherwise by the Engineer. Construction signing shall be incorporated in accordance with Part VI of the MUTCD, the plans, and Standard Plan Revised.

One traffic lane in each direction shall remain open at all times unless otherwise approved by the City.

J. SPECIFICATION FOR THE REMOVAL OF EXISTING TRAFFIC SIGNAL EQUIPMENT

General: This paragraph defines the general specifications and requirements that shall apply to removal of existing traffic signal equipment by the Contractor. The Contractor shall furnish all labor, equipment, and material necessary to accomplish the appropriate removal. In executing respective removals, care shall be taken to avoid damage to adjacent components, such as conduit or cable, which will be reused or remain in use. In the removal of a concrete foundation, for example, conduit entering the foundation shall be cut adjacent to foundation and adequately capped if to be abandoned or extended with conduit of like size to an alternate terminal location if to be retained. The extension shall be covered under separate items. The Removal of concrete foundations shall include the removal of all existing concrete, anchor rods and ground rods. The removal of any component, such as conduit or concrete foundations, requiring excavation shall be accompanied by the proper backfilling as specified in a previous section. The removal of any component, such as an overhead signal assembly, requiring the temporary placement of equipment in a travel roadway, shall be accompanied by the appropriate construction signs and barricades as specified in a previous section. All salvageable materials, such as controllers, signal heads, brackets, shafts, metal bases, etc., which are removed shall be delivered to the Traffic Engineering Signal Shop, 2832 Lafitte Street, New Orleans, Louisiana 70119.

Non-salvageable materials, such as concrete foundations shall be adequately disposed of in an appropriate manner.

K. REMOVING AND REPLACING IMPROVEMENTS

Improvements (such as sidewalks, curbs, gutters, portland cement concrete and asphalt concrete pavement, bituminous surfacing and base material) removed, broken or damaged by the Contractor, shall be replaced or reconstructed with the same kind of materials as found on the work or with materials of equal quality. All work shall be done in accordance with the Standard Specifications.

When a part of a square or slab of existing concrete sidewalk or driveway is broken or damaged, the entire square or slab shall be removed and the concrete constructed as specified above.

The outline of areas to be removed in portland cement concrete sidewalks and pavements shall be saw cut to a minimum depth of 2 inches prior to removing sidewalk and pavement material. Cut for remainder of the required depth maybe any method satisfactory to the Engineer. Cuts shall be neat and true with no shatter outside the removal area. There shall be no separate payment for sawcut associated with this type of work.

L. SEEDING AND MEDIAN RESTORATION

(a) General: This work includes furnishing all labor, equipment and materials necessary to dress and seed median areas and other areas disturbed during construction.

(b) Grass: Bermuda grass seed shall be extra fancy, hulled and treated, with a fungicide, lawn-type seed, delivered to the site in its original unopened container, with dealer guaranteed analyses and shall meet the Louisiana State Requirements. Seed shall be of the previous season's crop, Grade A, free from noxious weed seeds, with a minimum of 85% germination rate.

Bermuda grass shall be sown at a rate of a minimum 30 pounds per acre. Grass shall be maintained by proper watering and feeding until final acceptance of the project. If grass seed is sown before April 15 or after October 15, Perennial Rye Grass (Lolium Perennel) will be sown with the Bermuda grass seed at a rate of 60 pounds per acre. Specifications for rye grass are the same as for Bermuda grass.

Areas covered by grasses or weeds and area compacted during construction shall be lightly disked or scarified and rolled with a cultipacker as directed.

Grass seed shall be shown with rotary or other mechanical seeders.

Seeded areas shall be lightly rolled immediately after seeding.

(c) Fertilizer:

(1) Fertilizer for turf areas shall be commercial type gradulated or pelletized and furnished in suitable containers. Fertilizers shall conform to the commercial fertilizer law of 1948 (Act 93) issued by the Louisiana Department of Agriculture.

(2) Fertilizers shall be analyzed for minimum percentage by weight of Nitrogen (N), available Phosphoric Acid (P O) and 8 percent soluble Potash (K O).

(3) 8-8-8 fertilizer shall contain the following: 8 percent Nitrogen (N); 8 percent available Phosphoric Acid (P O) and 8 percent soluble Potash (K 0). Mechanical spreader shall be used to spread fertilizer at the rate of 1,000 pounds per acre.

(d) Watering: After seed has been planted, water shall begin immediately with approved watering tanks unless, in the opinion of the Engineer, there is sufficient moisture to eliminate watering. After the first watering, other waterings shall follow as directed. These watering operations shall continue as necessary until the project is finally accepted. Water shall be obtained from an approved source.

(e) Cleanup: The Contractor shall, periodically or as directed during the progress of the work, remove and properly dispose of debris, rubbish, trash, clippings, prunings and

defective or unacceptable materials. The Contractor shall continuously keep the project clear of hazardous obstructions.

Trash burning on the site will not be permitted.

Prior to final acceptance, all tools, surplus materials, equipment, trash and debris shall be removed and the site left in a neat and clean condition.

Paved areas shall be kept clean of soil, fertilizer, mulch, trash and debris and shall be maintained in a broom clean condition. Mud and soil tracked onto paved areas shall be removed promptly.

(f) Contractor's Maintenance: Maintenance shall include a necessary watering, cultivating, fertilizing, weeding, disease and insect control, protective spraying, replacement of dead material, adjustment of areas which settle and other procedures consistent with good horticultural practices which are necessary to insure healthy growth of grass.

(g) Qualifications and Responsibilities of Contractor

(1) The Contractor or Subcontractor shall have at least 5 years experience as a Landscape Contractor and shall be required to perform the work specified in the plans and specifications.

(2) The Contractor and his subcontractors shall comply with Louisiana Licensing Laws for Contractors, LA. R.S. 37:2151 et. seq., as applicable. "Contracting shall have a current and valid Louisiana General Contracting License, Horticulturist License and Landscape Contractor License as issued by the Louisiana State Horticultural Commission". Landscape contractors shall also have appropriate experience related to the work specified herein.

(3) The Contractor shall satisfactorily maintain and protect all work performed under this contract until acceptance of the work or portions thereof and shall repair or replace at his own expense any work damaged during that period to the satisfaction of the Landscape Architect.

(4) All portions of the property, including work of other contractors, which have been disturbed due to work performed under this contract shall be repaired and restored to the satisfaction of the Landscape Architect.

(5) Pavements and other work installed under the other contracts shall be kept clean of soil, straw and other materials incidental to work of this contract. Materials and equipment shall be stored where directed and shall be limited to the quantity required for the work. Rejected materials shall be immediately removed from the property.

(6) Seasonal Limitations Planting and seeding shall be done when soil and weather conditions permit.

(h) Qualifications of Personnel: The Contractor shall provide at least one person who shall be present at all times during execution of this portion of the project. This person shall be thoroughly trained and experienced in placing the plants specified and shall be knowledgeable of plant materials names, both common and scientific. This person shall also have experience directing all work performed under this section.

(i) Standards: The Contractor must meet requirements and recommendations of the applicable portions of the latest edition of the standards listed below:

(1) United States Department of Agriculture (USDA)

(2) Federal Seed Act (FSA)

(j) Supervision: The Parkway and Park Commission Horticulturist or his assistant shall be present during execution of this portion of work and shall be thoroughly familiar with the type of materials being removed from the construction site and being installed and the best methods for their removal and installation and shall direct all work performed under this section.

(k) Protection of Existing Trees and Shrubs

(1) General

The Contractor shall be responsible for damage to existing plant materials and liable to the Owner for equivalents or replacements, as authorized by the Landscape Architect.

No track vehicles will be allowed within the driplines of existing trees or shrubs. Only small, rubber tired vehicles and tools and equipment will be allowed within the area.

No material shall be stored within the driplines of plant materials.

No roots or branches of trees or shrubs shall be cut without the approval of the Parkway and Park Commission Urban Forester.

Grade changes, either excavating or filling, within the dripline of trees shall not exceed 2 inches.

Damage to existing trees during construction including broken limbs, cut roots, or damage trunks shall be immediately reported to the Parkway Forester and the Contractor shall bear the cost of repair by the Parkway Commission or a licensed Arborist.

A wooden barricade shall be constructed along the dripline of shrubs and trees for extra protection. The Contractor shall maintain this temporary barricade to the satisfaction of the Parkway Landscape Architect or Urban Forester, throughout the contract period. Dump, tandem trucks or track type vehicles will not be allowed to operate within the barricade or under the driplines of existing trees. No vehicles or equipment shall be chained or attached to trunks or limbs of existing trees on the site. No materials shall be stockpiled within barricades and the Contractor will not be allowed to affix any signs or barricade to the trees. The Contractor shall notify the Forester at the Parkway and Park Commission 48 hours prior to construction within the barricade. Only lightweight rubber-tired vehicles and hand labor will be allowed within this barricade.

(2) Access to the Site

No private vehicles shall be allowed access to the site by driving over curbs of streets onto neutral grounds or into parks. A suitable method of crossing the curbing into the site with equipment and material is to be presented to the Parkway Landscape Architect for approval.

(l) Bonding

The Parkway and Park Commission may require the Contractor to post a bond for the value of the trees, shrubs and restoration of the turf within the limits of the construction area.

(m) Maintenance of Neutral Grounds, Parks and Other City Greenspaces

The Contractor assumes all responsibility of the project area's maintenance from the commencement of construction until final acceptance of the project.

(n) Installation of New Utility Lines If installation of new utility lines or replacement of utility lines is to take place within the dripline of existing trees or shrubs, no trenching will be allowed. Only hydraulic jacking or hand diggings is allowed within plant dripline.

The Contractor must notify the Parkway Urban Forester or Landscape Architect at least 3 working days prior to utility line construction within the barricades at the driplines.

(o) Removal of Plant Materials

(1) Shrubs, trees and ground covers in the way of new construction shall be removed and reinstalled in accordance with following specifications.

(2) All work will be supervised by the Parkway and Park Commission Landscape Architect or his assistant. Notify the Landscape Architect (Telephone: 286-2100) at least 3 working days before this work commences.

(p) Cleanup

(1) The Contractor shall, periodically or as directed during the work, remove and properly dispose of debris, rubbish, trash, clippings, prunings and defective or unacceptable materials. The Contractor shall keep the project clear of hazardous obstructions.

(2) Trash burning on the site will not be permitted.

(3) Paved areas shall be kept clean of soil, fertilizer, mulch, trash and debris and shall be maintained in a broom clean condition. Mud and soil tracked onto paved areas shall be removed promptly.

(4) Protection of Lawn Areas and Restoration of Site: The Contractor shall take precautions to see that lawn areas are not damaged during construction. The Contractor shall fill and reseed areas damaged during his operation.

(q) Payment

Seeding and median restoration shall not be measured for payment, but shall be absorbed in the cost of other items in the contract.

M. STANDARD TRAFFIC SIGNAL SPECIFICATIONS

The following sections, labeled Sections 1400-1414 (excluding Sections 1405, 1409-1412) define the general specifications and requirements that shall apply to all equipment purchased by the Contractor under the various pay items. Where design tests are specified herein, documentation shall be provided indicating that such tests have been satisfactorily performed.

1400
DESCRIPTION OF WORK

1400.01 GENERAL: The work to be done consists of furnishing and installing all necessary materials and equipment to complete an in-place traffic signal system and/or modifying existing systems, all as shown on the Plans, standard or special details, and as set forth in these Special Provisions.

The signals and appurtenances shall be located as shown on the Plans or as directed by the Engineer.

All incidental parts which are not shown on the Plans, or specified herein, which are necessary to complete the traffic signal or other electrical systems shall be furnished and installed by the Contractor at no additional cost to the project.

1400.02 INTENT OF PLANS AND SPECIFICATIONS: Where the Special Provisions describe portions of the work in general terms, but not in complete detail, it is understood that only the best general practice is to prevail and that only materials and workmanship of the first quality are to be used. Unless otherwise specified, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals, and do all work involved in executing the contract in a satisfactory and workmanlike manner. Unless otherwise specifically noted, the Contractor shall perform all of the work explicitly or implicitly required by the Contract Documents.

(a) Field Equipment and Materials:

(1) As shown on the Plans, the following types of work may be required at certain intersections:

- Install new pedestal foundations and/or mast arm foundations.
- Remove existing traffic signal display heads, mast arms, pedestals, poles and foundations.
- install new mast arm poles, pedestal poles and/or wood poles.
- Install new pedestrian signal heads.
- Install new traffic signal heads.
- Install new traffic loops.

Install new junction boxes, conduit, signal cable and/or fiber optic cable.

1400.03 PUBLIC CONVENIENCE AND SAFETY: The following is added to Section 107.07 of the *Louisiana Department of Transportation and Development Standard Specifications for Roads and Bridges*, 2000 Edition:

(a) Traffic Control: The Contractor shall maintain and protect all existing traffic movements in accordance with Sections C129 and C713 of the General Specifications, and Section 104.03 of the Standard Specifications. No more than one traffic lane in each direction shall be restricted at any time.

No material or equipment shall be stored where it will interfere with the free and safe passage of public traffic. At the end of each day's work, and at other times when construction operations are suspended for any reason, the Contractor shall remove all equipment, debris and other obstructions from those portions of the roadway and sidewalks open for use by public traffic.

(b) Public Convenience: The Contractor shall conduct his operations as to offer the least possible obstruction and inconvenience to the public, and he shall have under construction no greater length or amount of work than he can prosecute properly with due regard to the rights of the public.

Unless otherwise provided, all public traffic shall be permitted to pass through the work with as little inconvenience and delay as possible. Only one lane of traffic may be closed at any time unless otherwise directed by the Engineer. Lane closures shall not be permitted during periods of inclement weather or at other times when, in the opinion of the Engineer, the lane closure would be a hazard to traffic.

Spillage resulting from hauling operations along or across any public traveled way shall be removed immediately by the Contractor at his expense.

Construction operations shall be conducted in such a manner as to cause as little inconvenience as possible to abutting property owners.

In order to expedite the passage of public traffic through or around the work and where ordered by the Engineer, the Contractor shall install signs, lights, flares, barricades and other facilities for the sole convenience and direction of public traffic. Also, where directed by the Engineer, the Contractor shall furnish properly trained flaggers whose sole duties shall consist of directing the movement of public traffic through or around the work.

The Contractor shall continuously review and maintain all traffic handling measures to assure that adequate provisions have been made for the safety of the public and workers.

(c) Working Time Restrictions: Without prior written approval of the Engineer, there shall be no lane closures, signal shutdowns, coordination interruption, or any work that reduces traffic capacity during the following periods:

(1) Between 7:00 A.M. and 9:00 A.M. or between 4:00 P.M. and 6:00 P.M., Monday through Friday.

(2) On the following holidays:

- New Year's Day
- Martin Luther King's Birthday
- Mardi Gras
- Good Friday
- Memorial Day
- Independence Day
- Labor Day

- Thanksgiving Day
- Christmas Day

The Engineer shall be notified a minimum of two (2) working days prior to any operational shutdown of a traffic signal.

(d) Restrictions for traffic signal controller and cabinet replacements:

(1) No signal shall be inoperative for a period of time longer than four consecutive hours of any one day or a total of eight hours of any one day.

(2) No signal shall be inoperative between the hours of 7:00 A.M. and 9:00 A.M. or between 4:00 P.M. and 6:00 P.M., Monday through Friday.

(3) No more than three intersections shall be out of service at any one time unless prior approval is given by the Engineer. If a signal is to be shut down and inoperative (i.e. no signal indication), the Contractor shall furnish two State-certified, off-duty, uniformed police officers who have arrest powers within the City of New Orleans to provide traffic control at no direct pay. It shall be the Contractor's responsibility to pay the officers for this service. The Contractor may install temporary traffic signals as an acceptable traffic control alternative.

1400.04 QUALITY ASSURANCE: The Contractor shall provide quality workmanship, materials and equipment and shall take precautions to protect existing facilities which do not require modifications.

1400.05 WORKMANSHIP: The equipment, including parts and accessories, shall be installed in a workmanlike manner and in accordance with best commercial practice. Particular attention shall be given to neatness and thoroughness of soldering, wiring, welding and brazing, plating, riveting finishes, and machine operations. Parts shall be free from burrs, sharp edges or other defects that could make the part or equipment unsatisfactory for the operation or function intended.

1400.06 INSPECTION: All work and materials to be performed or furnished under these specifications shall be subject to the direction and inspection of the Engineer. He and his authorized representatives shall at all times be given free access to the work or any part thereof and to any plant, yard, shop, mill or factory in which any article or material to be used or furnished in connection with the work is being prepared, fabricated or manufactured; and the Contractor shall provide every reasonable facility for obtaining sufficient information relative to performance of the work and character of materials an ascertaining that the quality of workmanship and materials is in accordance with the specifications.

The work shall be prosecuted only in the presence of the Engineer or inspector appointed by the Engineer, unless permission to do otherwise has been obtained. Inspection of the work, however, shall not relieve the Contractor of any obligation to properly fulfill his contract as prescribed; and if the work or any part thereof or any materials used in connection therewith, are

found to be defective or unsuitable at any time prior to final acceptance, he will be required to forthwith make good or replace such defective or unsuitable work or material.

Application for the Engineer or his inspector in connection with work under these Special Provisions shall be made by the Contractor at least 24 hours before the services will be required.

1400.07 GENERAL EQUIPMENT REQUIREMENTS:

(a) General:

(1) All equipment supplied under this contract shall be new.

(2) All controls, indicators, and connectors shall be clearly and permanently labeled.

(b) Outdoor Equipment: All conductive connectors, pins (except pins connected by soldering), and socket contacts shall be gold plated. Circuit boards shall be protected by acrylic conformal coating on each side that has conductive traces. Except for chips containing custom firmware, all components shall be soldered to the printed circuit board.

(c) Custom Equipment: Equipment that is not part of the manufacturer's standard product line, or that is made or modified specifically for this project, shall conform to the following requirements:

(1) Where practical, electronics shall be modular plug-in assemblies to facilitate maintenance. Such assemblies shall be keyed to prevent incorrect insertion of modules into sockets.

(2) All components shall be available from multiple manufacturers as part of the manufacturers' standard product lines. All must be clearly labeled with the value, part number, tolerance, or other information sufficient to enable a technician to order an exact replacement part.

(3) Lamps used for indicator purposes shall be light-emitting diodes.

(4) The printed circuit boards shall be composed of 62.2 grams of copper on 1.6 mm thick fiberglass epoxy or equivalent type construction. Holes which carry electrical connections from one side of the boards to the other shall be completely plated through. Multilayer printed circuit boards shall not be used. The name or reference number used for the board in the drawings and maintenance manuals supplied to the City shall be permanently affixed to each board.

(5) All components shall be mounted so that the identifying markings are visible, if practical.

(d) Environmental Conditions: Equipment shall continue to operate as specified under the following ranges of environmental conditions, except as noted in the specifications for individual

pieces of equipment. Equipment in the field shall meet the temperature and humidity requirements of NEMA Standard TS-1. Liquid crystal displays shall be undamaged by temperatures as high as 74° C, and shall produce a usable display at temperatures up to 49° C.

(e) Vibration and Shock: The equipment, when packaged in its normal shipping container, shall not be damaged, nor shall the operational performance be degraded after exposure to vibrations of 1g, 15 Hz to 500 Hz, or shocks of 5 g, 10 ± 1 milliseconds in each of three mutually perpendicular planes.

(f) Electrical Power:

(1) Operating Power: The equipment shall operate on 120 Volts, 60 Hz, single-phase unless otherwise specified. It shall conform to its specified performance requirements when the input voltage varies from 89 to 135 volts and the frequency varies ± 3 Hz.

(2) High Frequency Interference: The equipment operation shall be unaffected by power supply voltage spikes of up to 150 Volts in amplitude and ten microseconds duration.

(3) Line Voltage Transients: The equipment operation shall be unaffected by voltage transients of plus or minus 20 percent of nominal line voltage for a maximum duration of 50 milliseconds. Equipment in the field shall meet the power service transient requirements of NEMA Standard TS-1 when connected to the surge protectors in the cabinets.

(4) Protection: All equipment shall use readily accessible, manually resetable or replaceable circuit protection devices (such as circuit breakers or fuses) for equipment and power source protection.

(5) Brownouts: The equipment shall not be damaged when the main power drops to 95 VAC for a period of eight hours. If the equipment does not operate normally at 95 Volts, the equipment shall automatically resume normal operation within five seconds after normal power returns.

(g) Wiring:

(1) Permanently label every cable in every junction box or manhole it passes through. The labeling method(s) must be approved by the Engineer prior to use.

(2) Every conductor, except a conductor contained entirely within a single piece of equipment, must terminate either in a connector or on a terminal block.

(3) Permanently label and key connectors to preclude improper connection. The labeling method(s) must be approved by the Engineer prior to use.

(4) Terminal blocks must be affixed to panels that permanently identify the block and what wire connects to each terminal. This may be accomplished by silk screening or by installing a laminated printed card under the terminal block, with the labels on portions of the card that extend beyond the block.

(5) Protect personnel from accidental contact with all dangerous voltages.

(6) Do not install conductors carrying AC power in the same wiring harness as conductors carrying DC control or communication signals.

(7) Arrange wiring so that any removable assembly can be removed without disturbing wiring that is not associated with the assembly being removed.

1401
REGULATIONS AND CODES

1401.01 STANDARD SPECIFICATIONS: Except as otherwise specifically required by the Plans or these Special Provisions, all work on this project shall fully comply with the *City of New Orleans General Specifications for Street Paving*, 1999 Edition, (also referred to herein as the "General Specifications") and the *City of New Orleans Standard Plans for Street Paving*, (also referred to herein as the "Standard Plans"). Where specifically noted in these Special Provisions, materials and workmanship shall conform to the requirements of the *Louisiana Department of Transportation and Development Standard Specifications for Roads and Bridges*, 2000 Edition, (also referred to herein as the "Standard Specifications").

In the event of conflict between these Special Provisions and the General Specifications, Standard Specifications, and/or the Standard Plans, the requirements of these Special Provisions shall govern.

1401.02 COMPLIANCE WITH OTHER SPECIFICATIONS AND STANDARDS: All electrical equipment shall conform to the standards of the *National Electrical Manufacturers Association (NEMA) Standards Publication TS-1, 1989* (also referred to herein as the "NEMA TS-1, 1989"), *National Electrical Manufacturers Association (NEMA) Standards Publication TS-2, 1992* (also referred to herein as the "NEMA TS-2, 1992"), the Underwriters' Laboratories, Inc. (UL), and the Electronic Industries Association (EIA), wherever applicable. All materials and workmanship shall conform to the requirements of the *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD), *National Electrical Code* (NEC), *National Electrical Safety Code* (NESC), *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals*, Standards of the American Society for Testing and Materials (ASTM), American National Standards Institute, Inc. (ANSI), Rural Electrification Administration (REA), International Municipal Signal Association (IMSA), and any City codes and ordinances which may apply.

Wherever reference is made to any such specification, manual, code, or standard, the reference shall be construed to mean the version, as revised, that is in effect on the date of advertising for bids on this project.

1402
SUBMITTALS AND AS-BUILT DOCUMENTATION

1402.01 EQUIPMENT LIST: Within 10 days following award of contract, the Contractor shall submit to the Engineer for approval a list of major equipment and materials which he proposes to install. The list shall include all material that is identified on the Plans or in these Special Provisions, including detailed scale drawings of any non-standard or special equipment and any proposed deviation from the Plans.

1402.02 SUBMITTAL DATA: Prior to the purchase or fabrication of any equipment or material for use on this project, submit for review by the Engineer catalog cut sheets, descriptive manuals, brochures, and specifications for all standard, off-the-shelf items. These documents shall contain sufficient technical data for the Engineer to evaluate the proposed items. The quality, function, and capability of each deliverable item shall be described. Documents shall be originals or copies equal to originals. Shop drawings for each fabricated item shall also be submitted. These drawings shall contain all information required for complete fabrication in accordance with the Contract Documents, such as: materials, welds, finish, etc. Shop drawings shall be on sheets 550 mm in height and 900 mm long.

Provide four (4) copies of 213 mm x 275 mm submittals, and four copies of shop drawings.

The purpose of the submittal data is to show specifically and in detail how the Contractor intends to satisfy the requirements of the Contract Documents. If preprinted literature is utilized to satisfy some or all of these requirements, no statements on the literature should conflict with the Contract Documents. Cross off or initial any such statements and attach an appropriate statement clearly indicating how the requirements of the Contract Documents will be fulfilled. Clearly label each item of submittal data with the bid item number or other description of the item(s) to which it applies.

Each submittal must contain sufficient information and details to permit the Engineer to fully evaluate the particular component. Submittals which are, in the judgement of the Engineer, insufficient to permit proper evaluation will not be reviewed. Do not deviate from submittals marked "Accepted" or "Accepted as Noted" without the written consent of the Engineer. The City will not be liable for any material purchased, labor performed, or delay to the work prior to the approval of the equipment.

In order to expedite the submittal data process and equipment review, take care to address all of the requirements of the Contract Documents in the submittal data, leaving nothing to assumption, and clearly addressing the functional and technical interrelationships among the various components.

Following review of the submittal data, the Engineer will return to the Contractor one copy of the submittal marked "Accepted", "Accepted as Noted" or "Rejected". The Engineer will also mark each item which must be resubmitted. Proceed with any items marked "Approved" and items marked "Approved as Noted" if resubmission is not required. Do not proceed with any items which are marked "Rejected" or for which resubmission is required, but proceed immediately to correct said items and resubmit them for review. No time extensions will be granted to the Contractor as a result of the need to resubmit items for review.

Approval by the Engineer of a catalog cut sheet and/or shop drawing does not relieve the Contractor of any of his responsibility under the Contract for the successful completion of the work in conformity with the requirements of the Contract Documents.

1402.03 AS-BUILT DOCUMENTATION: Provide documentation of the work, as-built, as indicated below prior to acceptance of the work. Provide marked-up bluelines of the contract plan sheets and sepias of shop drawings showing actual installations or new information which is recognized to be of importance to the City, but was for some reason not shown on either the contract drawings or shop drawings. All documentation must be approved by the Engineer prior to final acceptance of the project.

Show all construction changes in detail on the plan sheets, including: final location and depth of conduits, junction boxes, and equipment cabinets; wiring external to equipment cabinets; locations of cable splice points; detector locations; and communications cable termination. Correct any errors to the as-built blueline plans upon review by the Engineer prior to final acceptance of the project.

In addition to the documentation specified above, prints of schematic diagrams applicable to the equipment contained therein shall be provided by the Contractor in a waterproof, opaque, resealable holder and mounted within each new cabinet.

1402.04 MEASUREMENT AND PAYMENT: No separate payment will be made for submittals and documentation.

1403

MILL TEST REPORTS AND CERTIFICATIONS

1403.01 MILL TEST REPORTS: Mill Test Reports (MTRs) shall be required for major structural items, and shall include both physical and chemical descriptions of the materials as supplied to the fabricator. When physical properties are altered during the fabricating, MTRs covering chemical composition shall be supplemented by certified test reports indicating the physical properties of this material after fabrication. MTRs shall be required for:

- Anchor Bolts
- Manhole Covers and Frames
- Traffic Signal Poles, Mast Arms, and Pedestals

1403.02 CERTIFICATION OF CONFORMANCE TO THE SPECIFICATIONS: Certification of Conformance to the Specifications shall be required for :

- Galvanizing
- Cable and Wire
- Traffic Signs (Aluminum and Reflective Sheeting)
- Program Heads

1403.03 MEASUREMENT AND PAYMENT: No separate payment will be made for mill test reports and certifications.

1404
TRAFFIC SIGNAL ITEMS

1404.01 CONCRETE FOUNDATIONS:

(a) General: Concrete foundations shall be installed as shown and described in the Plans. This work shall include all necessary excavations, forming, placing of reinforcement steel, placing of anchor bolts, placing of ground rods, placing of conduits, pouring of concrete, neatly finishing exposed areas of concrete, backfilling, removing excess materials and cleaning up the work area when completed. This work shall also include sizing foundations for the support poles described herein. The Contractor shall furnish all materials and equipment to complete the installations as shown and described in the Plans.

(b) Ground Wire and Ground Rods: Ground rods shall be of copper-weld or an equivalent rust-resisting material of the length and diameter shown on Plans. Clamps for ground rods shall be copper. Ground wire shall be AWG No. 6 bare copper wire.

(c) Concrete: Concrete for bases shall be Class A concrete conforming to Section 901 of the Standard Specifications.

(d) Reinforcement Steel: Reinforcement steel shall conform to Section 806 of the Standard Specifications.

(e) Anchor Bolts: Anchor bolts for concrete foundations shall be provided by the Contractor and shall conform to the foundation detail drawings and specifications contained herein.

(1) Pedestal Pole Bases: Anchor bolts for pedestal bases shall be 19 mm by 450 mm. Four (4) anchor bolts are required per concrete base. Each anchor bolt shall be supplied with two nuts and two flat washers. The embedded end of anchor bolts shall have a 75 mm L bend, and the exposed end shall have a minimum of 100 mm of threads. Anchor bolts shall conform to ASTM-A36 and shall be galvanized to conform to ASTM-A153.

(2) Aluminum Mast Arm Pole Bases: Anchor bolts for aluminum mast arm pole bases shall be 320 mm x 1800 mm. Four (4) anchor bolts are required per concrete base. Each anchor bolt shall be supplied with two nuts and two flat washers. Embedded end of anchor bolt shall have a 150 mm l bend and the exposed end shall have a minimum of 300 mm of threads. Anchor bolts shall have an offset formed as to extend the bolt from the foundation on a 440 mm bolt circle, 690 mm from the top end, going completely through the base and protruding through the top of the base 75 mm on a 330 mm to 350 mm bolt circle. The top 810 mm of the bolt shall be hot dip galvanized to meet ASTM A-153. Bolts shall be manufactured from ASTM A-576 modified to 55,000 psi minimum yield.

(3) Steel Mast Arm Pole and Metal Strain Pole Bases: Anchor bolts for mastarms shall conform to the requirements of AASHTO M314 Grade 55. The upper 305 mm of the bolts shall be hot dip galvanized per ASTM A153. Each anchor bolt shall be supplied with two hex nuts and two flat washers. The strength of the nuts shall equal or exceed the proof load of the bolts. A cast nut cover shall be provided for each anchor bolt. Each nut cover shall be attached

to the pole with a stainless steel hex bolt, as shown in the Plans.

(4) Controller Cabinet Base: Anchor bolts for the controller cabinet base shall be 19 mm X 450 mm. Four (4) anchor bolts are required per controller cabinet base. Each anchor bolt shall be supplied with 2 nuts and 2 flat washers. The embedded end of the anchor bolt shall have a 50 mm L bend. The bolt shall conform to ASTM-A36 and shall be galvanized to conform to ASTM-A153.

(f) Installation: The Contractor shall size foundations to support the total load presented at each location, including the pole, arm (where applicable), and signal heads. The foundations shall include conduit sweeps to accommodate all proposed conduits entering the pole, plus one additional spare conduit. Foundations shall be poured monolithically. Exposed portions shall be formed to present a neat appearance. The bottom of concrete foundations shall rest on firm undisturbed ground.

Forms shall be true to line and grade. Tops of footings for posts and standards, except special foundations, shall be finished at curb-to-sidewalk grade or as directed by the Engineer. Forms shall be rigid and securely braced in place. Conduit ends and anchor bolts shall be placed in proper position and to proper heights, and shall be held in place by means of a template until concrete sets.

Both forms and ground which will be in contact with the concrete shall be thoroughly moistened before placing concrete. Forms shall not be removed until the concrete has thoroughly set.

Ordinary surface finish shall be applied to exposed surfaces of concrete. When the edge of a concrete foundation or sidewalk section is within 450 mm of any existing concrete improvement, the sidewalk section shall be extended to meet said improvement.

Where obstructions prevent construction of planned foundations, the Contractor shall construct a foundation satisfactory to the Engineer whose price shall be full compensation for labor, equipment, materials and other necessary appurtenances required for a complete installation.

1404.02 TRAFFIC SIGNAL POLES:

Traffic signal poles shall be constructed in accordance with the details in the Plans and as described below:

(a) Pedestal Poles: The pedestal base shall be constructed of cast iron or aluminum and shall be a minimum of 330 mm square at the bottom and a minimum of 380 mm high. The upper end of the base shall be threaded to accept a 115 mm O.D. pipe shaft. The pole shall be hot dip galvanized and powder coated.

The base shall contain a removable door to allow access to anchor bolts and to permitcable splicing. The door shall be a minimum of 200 mm X 200 mm and shall then be fastened to the base by means of a stainless steel hex head screw into a threaded hole in the base. The shaft shall be 100 mm standard steel pipe (108 mm O.D.) meeting ASTM Designation A53G.

The shaft shall be threaded on one end to screw into the base. The overall length of the pedestal (shaft plus base) shall be 3.1 m.

The pedestal shaft shall be installed plumb in all directions plus or minus 25 mm of the top. Shims will not be permitted on pedestal foundations to achieve plumbness. Pedestal bases shall be grouted with non-shrink grout after the shaft has been plumbed.

(b) Steel Mast Arm Poles: Mast arm poles shall consist of a tapered pole, tapered signal mast arm(s), anchor bolts, and base plate.

(1) Pole: The pole shall be fabricated from coil or plate conforming to ASTM A595 Grade A with a minimum yield strength of 379.5 MPa or ASTM A572 with a minimum yield strength of 45 MPa. The pole shall be round in cross section and have a constant linear taper of 11.64 mm/m. The shaft shall be one piece, and contain no circumferential welded butt splices. Laminated tubes are not permitted. The pole shall have a reinforced 102 mm by 165 mm handhole with cover located 460 mm from the pole base. At mast arm connections, the pole diameter/thickness ratio (D/t) shall not exceed 52 for A595 Grade A tubes or 66 for A572 Grade 65 tubes. Each pole shall be provided with a zinc die cast end cap secured in place with set screws or a cap plate secured with a 19 mm diameter bolt, flat washer and mounting bar. The pole shall be hot dip galvanized and powder coated in accordance with Section 1408.

(2) Mast Arm: The mast arm shall be fabricated from coil or plate conforming to ASTM A595 Grade A with a minimum yield strength of 379.5 MPa. The arm shall be round in cross section and have a constant linear taper of 11.64 mm/m. All mast arms shall be manufactured and shipped in one piece, and have a minimum wall thickness of 4.5 mm. Circumferential welded tube butt splices and laminated tubes shall not be permitted. Each arm shall be provided with a zinc die cast end cap secured in place with set screws. The mast arm shall be hot dip galvanized and powder coated in accordance with Section 1408.

(3) Base Plate: Base plates shall conform to ASTM A36 or ASTM A572 Grade 42. Plates shall be integrally welded to the tubes with a telescopic welded joint, and shall be hot dip galvanized and powder coated in accordance with Section 1408.

(4) **Double Mast Arm Installations:** Where a double/dual mast arm installation is shown in the Plans, the first or higher arm shall be installed on primary parade route main street approaches as directed by the Engineer. For all double/dual mast arm installations, the Contractor shall submit for approval a sketch indicating the attachment height of both arms and the vertical clearance between signal housing and pavement grade for each respective approach.

(c) Aluminum Mast Arm Poles: Shall be Truss Type. The shaft shall be made of Aluminum Association Alloy 6063, seamless tapered tubing having the diameter and wall thickness as shown on the chart. After fabrication, the shaft shall be treated to T6 temper. It shall be free of longitudinal welds. A cast aluminum cap shall be provided with each shaft.

A one-piece aluminum anchor base, of adequate size and strength, shall be attached to the lower end of the shaft by two continuous welds made by the metallic-arc-consumable electrode-inert gas-shielded process, one inside of the base at the end of the shaft, the other outside the top of the base. The base shall be of Aluminum Association Alloy 356-T6.

A one-piece cast aluminum transformer base of Aluminum Association Alloy 356-T6 shall be furnished with each pole. The base shall be 500 mm in height, 350 mm square at the top and 440 mm square at the bottom. The base shall be provided with a removable door with a minimum opening of 230 mm x 350 mm. The base shall have a 440 mm bolt circle at the bottom and a 340 mm to 350 mm bolt circle at the top. Bases shall be provided with a grounding lug.

Upper and lower members of the mast arm must be of tapered seamless tubing of Aluminum Association Alloy 6063-T6. The wall thickness shall be in accordance with the chart. The

assembly shall consist of an upper and lower member joined by one or more welded vertical struts. Each member shall have a four-bolt, cast aluminum pole clamp welded to the end. The clamp shall be provided with a 5 mm diameter hole for wire entrance and, when assembled on the shaft, the clamp shall provide for internal wiring and a firm attachment between the shaft and arm assemblies.

All hardware with the exception of the anchor bolts shall be stainless steel. Pole shafts and mast arms shall be polished and shall be tie wrapped with a heavy water resistant paper for protection during shipment and installation.

The poles shall be installed with four nuts and washers on the underside of the transformer base and four nuts and washers on the top of the anchor base. Installation shall utilize full-length, one-piece anchor bolts (no extensions).

(d) Metal Strain Poles: metal strain poles shall be fabricated from a single sheet of hot-rolled basic open-hearth steel with a minimum yield strength of 48,000 psi. The shaft shall have a taper of approximately 1.2 mm per meter. A handhole with a nominal opening of 10 mm x 15 mm shall be located approximately 45 mm above the base of the pole. A steel cover shall be attached by means of two hex head screws. A grounding nut that will accommodate a 1-1/2" - 13 UNC hex head bolt shall be welded inside the pole easily accessible through the handhole. Poles shall be provided with a removable pole cap.

The anchor base shall be fabricated from structural quality hot-rolled carbon steel conforming to the requirements of ASTM A36. The base shall telescope the shaft and shall be affixed to the lower end of the shaft by two continuous electric arc welds, one being on the outside of the plate adjacent to the shaft and the other on the inside at the end of the tubular cross-section. The plate shall be provided with four slotted holes to receive anchor bolts and necessary tapped holes for attaching the removable bolt covers. Four cast iron bolt covers shall be provided with each pole.

All material shall be furnished galvanized. Galvanizing on shafts shall meet the requirements of ASTM A123. Miscellaneous hardware shall be galvanized according to ASTM A153.

1404.03 TRAFFIC SIGNAL HEADS:

(a) General Requirements: All traffic sections shall be of the adjustable type. Materials and construction of both types of sections shall be the same. Heads shall conform to the ITE Standard for "Adjustable Face Vehicular Traffic Control Signal Heads", latest edition. The number of sections per face shall be as shown on Plans. All signals shall be mounted vertically, except on mast arms, where they shall be mounted horizontally or vertically, as shown on the Plans.

(b) Housing: The housings shall be made of cast aluminum. If die cast they shall be made of either Alloy SS or Alloy SG3 of ASTM Specification BS5; if sand cast, they shall be made of Alloy SI of ASTM Specification B26.

All cast metal parts shall have a tensile strength of not less than 117 MPa and shall be clean, smooth and free from flaws, cracks, blowholes and other imperfections.

The bracket at the supported end of the signal section shall be of 38 mm conduit or of an equivalent inside clearance for wiring. The bracket at the opposite end of the section may be

either the same as the top or of solid construction. A set screw engaging a drilled hole shall be provided at each joint on the bracket where conduit type joints are used or an equivalent locking device shall be provided.

All edges shall be deburred and smooth with no cutting edges

Housings shall be sectional and each face shall consist of as many sections as there are optical units, together with a suitable top and bottom, all sections being rigidly and securely fastened together into one weather tight signal face.

Each face shall be arranged with round openings (slip-fit for 38 mm conduit) in the top and bottom so that it may be rotated a complete unit between waterproof supporting brackets or trunnions and thus be capable of being directed and locked at any angle in the horizontal plane. Serrations, detents, bolts or similar locking devices are required; friction will not be deemed an acceptable lock. These locks shall be such that any face will resist a torque of 6 N·m when assembled in accordance with manufacturer's recommendations.

The portion of the housing adjacent to the bracket shall be properly reinforced so as to have sufficient strength against breakage from shock. Seals, gaskets, labyrinths or a suitable combination of same shall be provided at bracket attachment points and at section joints to ensure water shedding. Supporting brackets or trunnions shall be used at top and bottom of section assembly to rigidly support all faces.

(c) Housing Door: The doors shall be cast aluminum and shall be suitably hinged and held securely to the body of the housing by simple non-corrosive locking devices which can be operated without tools. All other door parts, such as hinge pins, lens, clips, etc., shall also be stainless steel. Door hinge pins shall be so designed that the door will not accidentally become disconnected from housing when open regardless of signal position. Doors shall be field removable with simple tools.

Weather-resisting, mildew-proof neoprene or silicone rubber sponge gasketing shall be provided between the body of the housing and the doors in order to exclude dust and moisture.

(d) Visors: Each signal section shall have a visor which tilts downward approximately 8 degrees from the horizontal. The visor shall be of sheet construction of aluminum alloy not less than 1.3 mm (No.20 -18 U.S. Gauge) in thickness, or plastic (when specified). All edges shall be deburred and smooth with no cutting edges.

Tunnel visors shall be provided unless otherwise shown on Plans. The visor shall be attached to the door with stainless steel screws and shall be designed to fit tightly to the door and shall not permit any perceptible filtration of light between the door and the visor.

(e) Backplates: Traffic signal backplates shall be specifically manufactured for the type and brand of signal heads used to ensure proper fit with a border width of 125 mm. The backplates shall be without louvers and shall be of one-piece construction with the exception of those five-section cluster signal heads, which may be a maximum of five pieces.

(f) Optical Units: The optical units shall be comprised of LED modules as specified in Section 1414.

(g) Mounting: Signal sections and beacon sections shall be suitable for one of the following standard mounts, the type mount for each to be specified in the Plans.

(1) Pedestal Mounting. The pole shall be furnished with a slip fitter for placement on a 100 mm I.D. pipe pedestal with set screws for correct aligning of the signal. Provisions for base feed shall be incorporated into the design of the section assembly.

The section bracket assembly shall incorporate a weatherproof terminal compartment or box with a removable cover allowing complete access. The box shall be of suitable size to accommodate, and shall come equipped with, a terminal strip with terminals equal to the number of signal indications in the section plus one or more for common. The terminal compartment shall be neat in appearance and shall be adjacent to or near the pedestal mount. In no case shall feed wires be required to pass through a signal section or face to reach the terminal compartment. A terminal compartment integral with the bracket shall be permitted.

(2) Mast Arm Signal Brackets: Brackets and hardware for mounting traffic signals on mast arms shall be provided by the Contractor. Brackets shall be "Astro-Brac" type or approved equal, and shall accommodate the mounting of horizontal or vertical traffic signals at the locations shown on the Plans. Stainless steel banding shall be used for attachment of the brackets on mast arms. Brackets shall provide a rigid mounting of signal to mast arm to facilitate proper aim of traffic signals. The bracket shall be made of aluminum or other approved rust-proof materials.

Supporting brackets, trunnions and fittings may be made of cast aluminum or cast iron. All parts made of ferrous materials shall be treated to resist corrosion.

(3) Span Wire Mounting: Section shall be furnished with a suitable clamp to take 1/4" to 7/16" messenger wire. Clamp shall attach to or shall be integral with a balance adjusting device and a suitable weatherproof entrance section fitting the physical dimension herein for the entrance of signal cable. The span wire clamp and balance adjuster shall be hot-dipped galvanized if of a ferrous material and the clamp shall utilize a minimum of 2 "J" or "U" type bolts 3/8" or larger. The suspension pin shall be clevis type, ½" or 5/8" diameter. The balance adjustor shall be suitable for mating with a clevis type clamp having a horizontal clearance of 5/8" and pin of either ½" or 5/8". All hardware to be hot-dipped galvanized if of ferrous material.

The suspension point on the signal section bracket shall be 1-1/2" conduit female threaded or shall be slip fit for 1-1/2" conduit depending on how connection is accomplished. When slip fit is used, section shall come complete with necessary nut and washers for 1-1/2" conduit and provision shall be made for a positive lock to prevent accidental section rotation. Locking may be accomplished by means of serrations, detentes, set screws or some such similar device. Friction locking shall not be acceptable.

All span wire mounted signal sections shall come with a disconnect hanger.

(h) Installation: Signal heads of the various types and mountings shall be installed at locations indicated on the Plans or directed by the Engineer. Ample signal cable slack shall be left in the signal for field adjustment of the signal head.

The Contractor shall complete all wiring of signal heads using spade lugs on each conductor and terminate conductors on the terminal strips provided in disconnect blocks, terminal compartments or signal heads. All work shall be neat and to the satisfaction of the Engineer.

1404.04 PEDESTRIAN SIGNAL HEADS: Pedestrian signal heads shall be made of plastic, nonferrous metal, or a combination thereof. They shall conform to the ITE Standard for Vehicle Traffic Control Signal Heads except the number of sections in an assembly shall be one, and shall provide indications for the universal symbols of "Walk" and "Don't Walk".

1404.05 LOOP DETECTOR:

(a) General: Loops shall be of the size and shape indicated in the Plans. All detected lanes for the detected direction shall be separately detectorized. The Contractor shall be required to maintain loops which he installs for the duration of the project. Loop construction shall be in conformance with the details in the Plans and these Special Provisions.

(b) Saw Cut: Loop detectors shall not be installed in pavement that has been open cut, repaired, or rebuilt in a manner where the pavement structure is not sound and continuous in the area of the proposed loop installation. The Contractor shall first field inspect the loop locations and advise the Engineer of any such locations that have been open cut, repaired, or rebuilt. The Engineer will direct the Contractor in locating the loop detectors.

The Contractor shall mark the location of loops and get the approval of the Engineer prior to sawing the slot. A 305 mm separation shall be maintained between all loop wire saw slots wherever possible. Loop wire shall be installed in saw cuts in the roadway made by a diamond or abrasive power saw. The slot width and depth shall be as indicated on the Plans; however, in all cases, the slot shall be of sufficient depth to provide for a minimum of 25 mm cover between the top of the loop wires and the roadway surface.

The saw cuts shall be overlapped so that the slot has full depth at all corners. All corners where loop wires turn shall be diagonally cut so that there are no jagged edges or protrusions which may damage the wire.

Prior to installation of the wire, the saw cuts shall be cleaned and dried using oil-free compressed air. There shall be no cutting dust, grit, oil, moisture or other contaminants in the saw cut.

(c) Loop Wire: Loop wire shall be AWG #14 stranded Type XHHW gasoline and oil resistant single conductor insulated for 600 volts. XHHW wire shall meet the requirements of the latest editions of NEMA Standard WC-7, the NEC, and IMSA 51-3. The loop wire shall not have any cuts, nicks, abrasions or breaks in the insulation before or after installation in the slot. Any wire having defects in the insulation shall be replaced at the Contractor's expense.

Loop wire shall be one continuous length of wire with no splices. Loop wire from the curb or edge of pavement to the junction box shall be installed in a 25 mm conduit sweep. The loop wire for each loop shall be run in separate saw cuts from the loop to the junction box.

All loop wire lengths, including lengths in conduit and junction boxes, which are not imbedded in the pavement slot, shall be twisted with at least fifteen (15) turns per meter, and taped at one meter intervals.

The wire shall be placed in the bottom of the slot so that there are no kinks, curls, straining or stretching of the insulation. Subsequent turns of the loop shall be placed to assure vertical stacking of the wires.

Special care shall be taken in seating the wires so that the insulation will not be broken or abraded. No sharp tools such as a screwdriver or metal object shall be used for this operation. Loop location and configuration shall be as shown on the Plans unless otherwise directed.

(d) Loop Sealant: All saw cuts with the wire installed shall be inspected and approved by the Engineer before the sealer is installed.

The sealant shall be 3M, Bondo P-606, Prece Loop Sealant or an approved equal. The sealant shall be a one- or two-component sealant designed specifically for sealing detector loops in concrete or asphalt. It shall have satisfactory compressive strength to bridge the saw cut under traffic, but remain flexible to compensate for thermal contraction or expansion.

The Contractor shall install the sealer in strict adherence to the manufacturer's recommendations and these specifications. Do not apply the sealant when the air temperature is below 7°C, or during precipitation.

The viscosity of the sealer shall be such that it can be readily poured into the slot, completely surround the wires, displace all air and fill the slot so that the sealer is flush with the roadway surface. The finished sealed slot shall be waterproof and present a neat workmanlike appearance.

The sealer shall be sufficiently hardened as per manufacturer's specifications, before allowing traffic on it.

(e) Detector Lead-in Cable: Each loop shall have its own, separate lead-in cable. Detector lead-in cable shall be shielded and shall conform to IMSA Specification 50-2, AWG #14.

Lead-in cable shall be installed in a continuous run from the loop wire splice in the curbside junction box to the cabinet mounted terminal strip allocated for detector lead-in cable termination. No splices shall be allowed between these points. The Contractor shall take adequate measures to protect cable from damage during handling and installation.

All splices in junction boxes must be carefully made to insure constant low resistance, and must be insulated by means of a plastic casting splice kit to render a waterproof joint. Connections shall be soldered. The shielded drain wire in the junction box shall be cut off flush and waterproofed so as not to come in contact with the junction box or ground. The shielded drain wire shall be terminated with a ground wire and solidly grounded at the amplifier.

All detector lead-in cable shall be tagged with sleeve labels to identify each cable with its associated loop location and cabinet terminal number. The detector lead-in cable shall be labeled both inside the controller cabinet and inside the junction box. The legend shall be clear and readable and shall not deteriorate with exposure to dirt, water, sun or other conditions found in controller cabinets. The legend shall be firmly and securely fixed to the lead-in cable near the cable termination. The Contractor shall provide the Engineer with an as-built record of each detector lead-in installed and for each vehicle detector amplifier installed. This record shall be in a format approved by the Engineer.

1404.06 REMOVAL AND SALVAGE: The Contractor shall remove existing traffic signal equipment as shown in the Plans. Equipment that is removed, including signal heads, poles, mast arms, preemption devices, cabinets, controllers, conflict monitors, and plug-in devices (load switches, relays, etc.) shall be salvaged. Foundations, risers, field wire and cable which are removed and not reused shall become the property of the Contractor and shall be disposed of properly. Materials to be salvaged will remain the property of the City, and shall be transported by the Contractor to the Signal Shop, at 2832 Lafitte Street, New Orleans, Louisiana between the hours of 7:30 am and 3:00 pm, Monday through Friday. All materials to be salvaged shall remain in the custody of the Contractor until such time as they are delivered to the City.

The Contractor shall not damage any salvaged material and shall be required to, if requested, demonstrate to the Engineer that such material is indeed in working order. The Contractor shall restore or replace, at his own expense, any salvaged material which is damaged by his operations. All material shall be tagged with a label specifying the location from which the material was removed.

1404.07 REMOVAL AND REPLACEMENT: Existing facilities such as sidewalks, curbs, gutters, pavement, etc. that are removed, broken or damaged by the Contractor, shall be replaced or reconstructed in kind. When a part of a square or slab of existing concrete sidewalk or driveway is broken or damaged, the entire square or slab shall be removed and replaced in kind.

1404.08 MEASUREMENT AND PAYMENT:

(a) Signal Support Items (Type) (Size/Configuration) will be measured in units of each and paid for at the contract unit price per each. This price shall include fabricating, furnishing and installing the various signal support items, including the pole, foundation, anchor bolts and plates, and miscellaneous hardware required for a complete installation.

(b) Traffic Signal Head will be measured in units of each and paid for at the contract unit price per each. This price shall include furnishing and installing the signal head, including mounting brackets, and miscellaneous hardware required for a complete installation.

(c) Pedestrian Signal Head (1-Section) will be measured in units of each and paid for at the contract unit price per each. This price shall include furnishing and installing the pedestrian head, including mounting hardware, pushbutton detectors, and miscellaneous hardware required for a complete installation.

(d) Removal of Existing Signal Equipment will be paid for on a lump sum basis. The price shall include removal of all existing signal equipment as shown in the Plans and as described above; and storage and delivery of equipment to the Signal Shop, at 2832 Lafitte Street, New Orleans, Louisiana.

(e) Loop Detector will be measured in linear feet of sawn slot and paid for at the contract unit price per foot. This price shall include sawing, installed wire (3 turns), and sealing. Measurement will be made from the edge of the pavement and once around each loop perimeter.

(f) Detector Lead-in Cable (Size) will be measured in feet and paid for at the contract unit price per foot. This price shall include furnishing, installing, and testing the detector lead-in cable, including all conductors, markings and identification, terminal blocks, connections, splices, and furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.

1406
CABLE

1406.01 **TRAFFIC SIGNAL CABLE:** Contractor supplied traffic signal cable shall be 7 conductor #14 AWG stranded cable for traffic signals, and 5 conductor #14 AWG stranded cable for pedestrian signals. Cable shall meet IMSA 20-1 specifications with the following exceptions:

- **Each conductor shall consist of 7 tinned copper strands.**
- **No fillers shall be allowed.**
- **Tracer ink on cables shall be indelible so it will not flake or rub off under normal use.**

1406.02 ELECTRICAL SERVICE CABLE: Electrical Service Cable shall be 2 conductor AWG #6 solid, meeting the NEC requirements for XHHW cable.

1406.03 OPTICAL DETECTOR CABLE: The Contractor shall provide 3 conductor optical detector cable at locations shown on the Plans as part of the emergency vehicle preemption system described in Section 1409. The cable shall meet the requirements of the Louisiana DOTD Traffic Control Standard Number 58.

1406.04 COMMUNICATIONS CABLE:

(a) Fiber Optic Cable. Furnish and install fiber optic cable with the number of fibers as shown on the Plans. Fiber optic cable shall be installed underground in conduit. The cable shall meet the following requirements:

- **Single-mode fiber.**
- **Loose tube cable.**
- **Dielectric central member.**
- **Medium density polyethylene cable jacket.**
- **Meets Bellcore TR-TSY-000020, REA PE-90 and ANSI/ICEA S-87-640 per requirements of ANSI/TIA/EIA-568A Commercial Building Telecommunications Cabling Standard.**
- **Reverse oscillation buffer tube stranding.**
- **Length markings printed every 0.6 meters along outer jacket.**
- **Attenuation at 1310/1550 nm: 0.35/0.25 dB/km (maximum attenuation for every fiber in cable across entire operating temperature range).**

- **Operating temperature range: -40°C to +70°C.**

(b) Twisted Pair Cable: Furnish and install twisted pair cable with the number of pairs as shown on the Plans. Twisted pair communications cable shall be installed underground in conduit. The cable shall meet the following requirements:

- **19 AWG**
- **Gel filled (petrolatum-polyethylene gel filling compound), meeting REA Spec. PE-39.**
- **Solid, soft drawn, annealed bare copper conductors**
- **Corrosion/oxidation resistant corrugated aluminum tape shielding, 0.002 mm thick**
- **Length markings printed every 0.6 meters along outer jacket**

1406.05 FIBER OPTIC SPLITTER/COMBINER PAIRS: Install fiber optic splitter/combiner pairs inside controller cabinets at locations shown in the Plans. They will be used to split communications coming from the TCC, and combine communications going to the TCC, at locations where a branch in the communications cable run occurs. For signals traveling from the transceivers to the TCC, the light transmitted from each transceiver will be combined with the light coming from the upstream transceivers in that string. Hence, the name "splitter/combiner pair" refers to the splitting and combining of light, splitting signals traveling from the TCC, and combining signals traveling to the TCC.

Using the optical budget supplied by the manufacturer of the fiber optic tranceivers, calculate the required split ratio of each splitter/combiner pair such that each modem receives enough light to receive the data signal, plus an additional 3dB. Use only the split ratios defined below, and take into account the losses due to splices in the cable, connectors, attenuation, and the insertion loss of the splitter or combiner. Furnish all optical budget calculations in spreadsheet form to the Engineer on an MS-DOS compatible 90 mm (3.5") diskette, and in hardcopy form. Include any assumptions made. Do not install any splitters or combiners until the calculations have been approved by the Engineer.

Install the splitter/combiner pairs in the fiber optic splice enclosures inside equipment cabinets. A splitter/combiner "pair" is defined as one splitter and one combiner with equal split ratios, one used to split light from one fiber to two fibers, and the other used to combine light from two fibers onto one fiber. There shall be no physical difference between a splitter and a combiner except the method in which it is installed. Only the splitter is described in these Special Provisions.

Splitters shall use single-mode fiber in a 1x2 port configuration, and shall be capable of operating at a 1310 nm wavelength. Provide splitters that are manufactured with the following split ratios, and that exhibit insertion losses no greater than shown below.

Split Ratio	Insertion Loss (dB)
50/50	4.3
40/60	5.3/3.1
30/70	6.8/2.3
20/80	8.7/1.5
10/90	13.3/1.0
5/95	20.0/0.8

Typical thermal stability shall be ≤.2dB.

Operating temperature shall be -20°C to +70°C.

The splitter package shall be hermetically sealed to prevent moisture infiltration, and shall include a corrosion resistant tube and strain relief provision to protect the optical split. The fibers extending from each of the three ports on the splitter package shall be marked or colored to distinguish input, primary output, and secondary output fibers. The input and primary output fibers shall be at least 1.8 meters long. The secondary output fiber shall be at least 3.6 meters long, and shall be equipped with a factory installed ceramic ST connector. The splitter package shall have a pull strength greater than 907 grams.

1406.06 WIRING METHODS: Furnish and install all necessary spade lugs, crimped solderless connectors, recessed-screw barrier-type terminal blocks, tape, Engineer-approved waterproofing material, wire wrap, UV resistant nylon wire ties (if used external to cabinet), grounding wire, ground rods and all other material necessary to install and connect the wire and cable to form a fully functioning system.

Where wire or cable is installed in conduit, use only a cable pulling lubricant approved by the Engineer. Seal all wire and cable ends with an approved material and technique to exclude moisture until properly spliced or terminated.

Dress all field wiring entering a cabinet against the walls of the cabinet. Harness, clamp, or lace field wiring as required. The Engineer may require additional clamping, lacing, or harnessing if, in his judgement, this is required for an acceptable installation. Terminate all electrical wire on recessed-screw, barrier type termination blocks.

Do not make any electrical splices at any point in the work required by this Contract except at recessed-screw, barrier type terminal strips in the equipment cabinets. Do not install terminal strips on the floor or bottom of equipment cabinets.

Protect all new conductors and cables from damage and from moisture and water absorption.

1406.07 CABLE INSTALLATION:

(a) General. Use appropriate installation techniques such that the optical (fiber optic cable) and mechanical characteristics of the cable are not degraded. Unless otherwise approved by the Engineer, use only the equipment and procedures specified by the manufacturer of the cable. Install the cable in such a way that neither the minimum bending radius nor the maximum pulling tension are violated before, during, or after installation.

Take every precaution to ensure that the cable is not damaged during storage and installation. Do not allow workers to step on the cable or run it over with any vehicle or equipment. Replace and reinstall any cables that are damaged at no additional cost to the project.

Cable runs shall be continuous between allowable termination points in controller cabinets or splice cabinets. Carefully determine the length of cable necessary to reach from termination point to termination point. Do not splice cable in conduit, junction boxes or manholes. An exception to this requirement is detector lead-in cable, which shall be spliced to loop wire in the junction box adjacent to the saw cut.

All conductor cable slack shall be stored in manholes, not in the equipment cabinets.

No separate payment will be made for equipment used to install, terminate and test the cable, the cost of which shall be included in the unit price to furnish and install the cable. The unit price for cable shall also include all cable ties, clamps, and other hardware required to install the cable.

(b) Underground Installation: Before any underground cable installation is performed, provide the Engineer with four (4) copies of the cable manufacturer's recommended and maximum pulling tensions for each cable size and type. These pulling tensions shall be specified for pulling from the cable's outer jacket. Also provide a list of the minimum allowable cable bending radius and the cable manufacturer's approved pulling lubricants and guidelines for their application. Only these lubricants will be permitted.

The installation system to be used must be inspected and approved by the Engineer. Do not pull the cable along the ground, over edges or corners, over or around obstructions, or through unnecessary curves or bends. Use approved cable guides, feeders, shoes and bushings to prevent damage to the cable during installation.

Establish adequate voice communications between the cable feeding location and the cable pulling equipment prior to commencing any pulling operations. Set up the cable reels on the same side of the junction box or manhole as the conduit section in which the cable is to be placed. Make the reel level and bring it into proper alignment with the conduit section such that the cable will pass from the top of the reel in a long smooth bend into the duct without twisting. Do not pull the cable from the bottom of the reel. Feed the cable by manually rotating the wheel. Pull the cable in the conduit with a cable grip designed to provide a firm hold on the exterior covering of the cable. Use an approved cable feeder guide between the cable reel or storage stack and the face of the duct to protect the cable, and to guide the cable into the duct as it is played off the reel or from the storage stack. The dimensions and set-up of the feeder guide shall be such that the cable does not bend at any location to a radius less than the cable's minimum allowable bending radius. Do not exceed this minimum bending radius at any time during cable installation.

Keep cable ends sealed at all times during installation, using an approved cable end cap. Do not use tape to seal the cable end. Keep the cable end sealed until termination takes place. Provide a minimum of 12 meters of slack for cables that are not immediately terminated.

The allowable pulling tension shall be 70 percent of the manufacturer's maximum pulling tension for pulling by the outer jacket. Ensure that the allowable pulling tension is not exceeded at any time during cable installation by using one of the following methods, as approved by the Engineer:

- **Pulling the cable by hand.**

- **Approved mechanical means. If the cable is pulled by mechanical means, use a clutch device to ensure the allowable pulling tension is not exceeded. Also, attach a strain gauge to the pulling line at the cable exit location, and at a sufficient distance from the take-up device, such that the strain gauge can be read throughout the entire cable pulling operation.**

Use an approved lubricant, in the amount recommended by the cable manufacturer, to facilitate pulling the cable. Lubricate the cable as it is payed off the cable reel or storage stack into the cable feeder. Place an approved cable lubricator (funnel) around the cable just ahead of the cable feeder to facilitate proper lubrication of the cable. After the cable has been installed, wipe the exposed cable in a junction box, manhole, or cabinet clean of cable lubricant with a cloth before leaving the junction box, manhole, or cabinet.

The Contractor may, at his own option and with the Engineer's approval, furnish, install, and pull cable through an intermediate junction box or manhole. Intermediate junction boxes or manholes will be considered part of cable installation, and no separate payment will be made for this work.

Pull the necessary length of cable to be installed from one junction box, manhole or cabinet, to the immediate next downstream junction box, manhole or cabinet. Carefully store the remaining length of cable to be installed in the next conduit in a manner that is not hazardous to pedestrian or vehicular traffic yet ensures that no damage to the cable occurs. Store the cable in a manner that allows that length of cable to be safely pulled into the next conduit. Use a storing method that is approved by the Engineer.

In manholes adjacent to cabinets, store 12 meters of slack communications cable, for each type of cable that passes through the manhole. In all other manholes, store at least three meters of slack. Neatly store slack cable on the side walls of the manhole using racking hardware approved by the Engineer.

(c) Termination and Splicing: Terminate communications cable only in controller cabinets, the CCTV cabinet, termination cabinets, or splice cabinets, as shown on the Plans, unless otherwise approved by the Engineer. At all termination points, any communications cable that is not immediately terminated shall be sealed with an approved end cap. Tape will not be permitted to seal the cable end. The cable end shall remain sealed until termination takes place. Cables that are not immediately terminated shall have 12 meters of slack. Slack is defined as the length of cable extending out of the cabinet opening when the cable is held straight outward. All terminations and splices must be approved by the Engineer. The cost of termination and splicing, including the cost of terminal blocks, connectors, caps, sealants, mounting hardware, and jumpers, is incidental to the cost of cable installation and will not be paid separately.

(1) Fiber Optic Cable: Splice through all fibers that are not used at a particular cabinet, and cap unused fibers that end in a cabinet. At fiber optic termination points provide a fiber optic splice enclosure. Make all fiber terminations by splicing the fiber to factory connectorized pigtails using fusion splicing only. The pigtails shall be buffered, strengthened with aramid, and shall meet the requirements for fiber optic cable specified previously. All pigtail connectors shall be the ceramic ST type. Use the pigtails to connect the fiber optic cable to the equipment in the cabinet. Permanently label all fiber optic connectors, whether on pigtails

or equipment, to preclude improper connection. The labeling method(s) must be approved by the Engineer prior to use. The Contractor shall coil six (6) meters of incoming fiber optic cable and six (6) meters of outgoing fiber optic cable in each cabinet for termination purposes. All splices must use fusion splicing.

(2) Twisted Pair Cable: In all controller cabinets, termination cabinets, and the CCTV cabinet, the Contractor shall terminate all of the conductors of the twisted pair cable(s) in a neatly arranged manner. Recessed-screw, barrier type terminal strips of sufficient size to terminate all cable pairs shall be furnished and installed by the Contractor. The terminals shall be cleaned before terminating the cable. Non-insulated, #18-20 AWG, spade crimp terminals shall be applied to the cable using a calibrated ratchet type crimp tool. After the cable is terminated, the terminal facilities shall be treated with a corrosion preventative material.

On each terminal block that bridges two segments of cable, each pair in one cable shall be connected to the corresponding pair in the other cable, so as to form a continuous communication circuit. An exception is that no links shall be created that would be terminated to a piece of equipment at one end, with no equipment termination at the other end.

The cable shall be opened in the following manner:

- **Remove enough of the outer jacket to provide length of the individual conductors in a manner that does not damage the shield's protective coating.**

- **Split the shield into two semicircular halves and neatly bend the halves back over the outer jacket. Cut the shield to not less than 25 mm but not more than 50 mm.**

- **Permanently attach bonding wire to the shield with a copper clamp approved by the Engineer.**

- **Cover the cable to approximately 25 mm beyond each end of the shield with heat shrink tubing approved for outdoor use. Shrink the tubing completely and neatly.**

(3) Fiber Optic Splice Enclosures: Fiber optic splice enclosures shall be steel enclosures designed to store fiber optic fusion splices. At every cabinet where fiber optic cable is spliced or terminated, install either a large or small fiber optic splice enclosure, depending on the number of fibers to be spliced/terminated. All enclosures shall be finished with a neutral or beige colored powder coat. Small and large fiber optic splice enclosures will be considered part of the cabinet in which they are installed, and no separate payment will be made.

- Small Fiber Optic Splice Enclosures: **In every cabinet where 12 fibers or less are spliced or terminated, furnish and install a small fiber optic splice enclosure. Small fiber optic splice enclosures shall be Siecor Model NSO-012-41, or an approved equal, and shall have the capacity to house at least 12 fiber splices using a single splice tray. The unit shall weigh no more than 1.5 kilograms, shall occupy no more than 2000 cubic**

centimeters of space, and no dimension shall be longer than 260 mm. The unit shall include provisions for cable strain relief, for neatly organizing slack fiber and buffer tubes, and for wall mounting the unit.

- Large Fiber Optic Splice Enclosures: **In every cabinet where more than 12 fibers are spliced or terminated, install a large fiber optic splice enclosure. Large fiber optic splice enclosures shall be Siecor Model WSC-001, or an approved equal, and shall have the capacity to hold, and shall come equipped with, seven fusion splice trays, enough to accommodate 84 splices. The enclosure shall also come equipped with a locking kit and provisions for wall mounting the unit, cable strain relief, and for neatly storing slack fiber and buffer tubes. The enclosure shall be able to accommodate a minimum of five outdoor fiber optic cables. The enclosure shall weigh no more than 5.5 kilograms. If more than 84 fibers are spliced or terminated, install additional large fiber optic splice enclosures to accommodate the additional fibers.**

(4) Fiber Optic Cable Installer Requirements: Personnel involved in the installation, splicing, and termination of the fiber optic cables must meet the following minimum requirements:

- Three (3) years experience in the installation of fiber optic cables, including splicing, terminating, and testing of single-mode fibers.

- Experience in having installed at least two (2) fiber optic networks, totaling at least 16 km of fiber optic cable in outdoor conduits, and where those networks have been in continuous satisfactory operation for at least two (2) years.

Submit documentation indicating the qualifications and experience of the personnel that will perform the installation, splicing, and termination of the fiber optic cable. The documentation must include names, addresses, and telephone numbers of two (2) network owners, who may be contacted regarding these installations. No fiber optic cable shall be installed until the installation personnel have been approved by the Engineer in accordance with the minimum requirements specified above.

1406.08 MEASUREMENT AND PAYMENT:

(a) Fiber Optic Communications Cable, Size (Type) will be measured in meters and paid for at the contract unit price per meter. This price shall include furnishing, installing, and testing the fiber optic cable, including all conductors, markings and identification, connectors, splice kits, connections, splices, pigtails, and furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.

(b) Twisted Pair Communications Cable, Size will be measured in meters and paid for at the contract unit price per meter. This price shall include furnishing, installing, and testing the twisted pair cable, including all conductors, markings and identification, terminal blocks,

connections, splices, and furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.

(c) Traffic Signal Cable (Size) will be measured in meters and paid for at the contract unit price per meter. This price shall include furnishing, installing, and testing the signal cable, including all conductors, markings and identification, terminal blocks, connections, splices, and furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.

(d) Optical Detector Cable (Size) will be measured in meters and paid for at the contract unit price per meter. This price shall include furnishing, installing, and testing the optical detector cable, including all conductors, markings and identification, terminal blocks, connections, splices, and furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.

(e) Fiber Optic Splitter/Combiner Pair will be measured in units of each and paid for at the contract unit price per each. This price shall include furnishing, installing, and testing the splitter/combiner pair, including all conductors, markings and identification, connectors, splices, pigtails, and furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work. This price shall also include the optical budget calculations, as described in these Special Provisions.

1407
CONDUIT

1407.01 GENERAL: All underground conduit shall be polyvinyl chloride (PVC) conduit, except where otherwise directed by the Engineer. Short extensions to existing metallic conduit may be required as directed by the Engineer, in which case metal conduit shall be used.

The ends of all conduits, whether shop or field cut, shall be reamed to remove all burrs and rough edges. Cuts shall be made square and true so that the conduits butt or come together for their full circumference.

1407.02 PVC CONDUIT: The Contractor shall install PVC conduit of the type, size and at locations shown on the Plans. PVC conduit shall be Schedule 40, and shall meet the latest requirements of NEMA TC-2. Conduit shall come equipped with termination fittings at all ends, and shall be installed so that cable may be readily pulled into it without damage.

1407.03 MULTIDUCT CONDUIT: At locations shown on the Plans, the Contractor shall furnish and install a nominal 100 mm multiduct conduit with an integral 150 mm extended gasketed bell and a spigot coupling. The conduit shall be Schedule 40 PVC conduit suitable for direct burial, and conforming to the requirements of NEMA TC-2. Provide external spacers for the support of the conduit in the trench, and for the separation from additional conduits in the trench. All spacers shall be molded from a high impact PVC plastic, and shall match the impact resistance of the multiduct conduit itself. External spacers will be considered incidental to conduit installation, and will not be measured for separate payment.

Do not use cement to assemble individual conduit or bend sections. Mark the spigot end with a circumferential ring to ensure proper insertion depth during coupling. Identically mark each conduit segment with a longitudinal running print line to assure proper innerduct orientation and alignment. Use fixed or flexible bends of the same material as recommended by the manufacturer to avoid obstructions, and to make the bends shown in the Plans. The conduit shall contain four preassembled nominal 32 mm prelubricated PVC innerducts. The innerducts shall be installed and lubricated at the factory. Provide a non-cemented spacer system to hold the innerducts in a square configuration.

1407.04 RIGID METAL CONDUIT: Metal conduit and fittings, where required, shall be standard weight, rigid galvanized steel (intermediate weight not acceptable) and shall comply with the Underwriters Laboratories Standard UL 6, Federal Specification WW-C-581-C and ANSI C 80-1. Rigid metal conduit will only be used for short (< 2m) extensions of existing conduit, and for loop wires. No separate payment will be made for rigid metal conduit.

1407.05 MANHOLES: Manholes shall be installed at locations shown on the Plans or as directed by the Engineer. The Contractor may install additional manholes with the approval of the Engineer at no additional compensation.

The bottom of the manhole shall rest firmly on aggregate bedding with a minimum depth of 30 mm at the bottom and extending 150 mm from the outside edge of manhole, unless otherwise specified by the Engineer. Bedding shall conform to Section 726 of the Standard Specifications.

Below ground, backfill shall be compacted to the approximate density of the surrounding soil. Above ground, the material shall be compacted to 95 percent of maximum density. Maximum density shall be determined in accordance with DOTD Designation TR 418 and the in-place density determined by DOTD TR 401.

Manholes shall be reinforced concrete and shall be constructed in accordance with ASTM Designation C 76.

A cast iron frame and cover of dimensions shown in the Plans shall be installed in each manhole. Castings shall be Class 30 and shall conform to Section 1013.06 of the Standard Specifications. Covers shall have a bossed or ribbed top surface of 6 mm in relief. Notches shall be provided for removing the cover. The word "TRAFFIC" shall be three mm in relief as indicated on the Plans. Covers shall be level with the pavement or with the curb or sidewalk grade, or with surrounding ground, as required.

Frames shall have a minimum weight of 80 kilograms. Covers shall be of the "Extra Heavy" type with a minimum weight of 65 kilograms.

1407.06 JUNCTION BOXES: The Contractor shall install junction boxes at locations shown in the Plans. Junction boxes shall be in conformity with the details shown in the Plans.

1407.07 CONDUIT INSTALLATION: In accordance with Section 736.17 of the Standard Specifications with the following additions and exceptions:

Where two or more conduits are to be installed in the same trench, impact-resistant plastic spacers shall be utilized. The spacers shall be installed a maximum of 2.4 meters on centers, and shall provide a separation between conduits equal to at least 65 percent of the diameter of the conduit.

Immediately prior to the installation of cables, all conduit runs longer than 10 meters, including existing conduits which are to be utilized, shall be carefully rodded, swabbed, or otherwise cleaned to insure that the interior is free and clear of all obstructions. After the conduit has been cleaned, each conduit shall be gauged by pulling through a metal ball of a diameter not less than 85 percent of the nominal inside diameter of the conduit, to ascertain that the conduit is free of any obstruction or foreign material. If the ball fails to pass through the conduit, the defective conduit shall be repaired or replaced without additional compensation (Contractor-installed conduit), or at bid unit prices (existing conduit).

Conduit bends and elbows made in the field shall have a radius of not less than nine times the inside diameter of the conduit and all such bends shall be made without crimping, denting or otherwise damaging the conduit. No field bends will be allowed for multiduct conduit. Field bends shall be made with an industry-accepted flameless heater designed to distribute heat evenly over the section of conduit being bent. Internal supports shall be provided to prevent deforming of the conduit during the bending. Manufactured bends and elbows of identical material to the conduit may also be used. Any bends in conduit other than the 90 degree bend into a foundation or as shown on the Plans shall require the prior approval of the Engineer.

(a) Trenching and Backfilling: Excavations for the installation of conduit shall be performed in such a manner as to cause the least damage to streets, sidewalks and other facilities. Excavation shall not be performed until immediately before installation of conduit. Material from the excavation shall be so placed as to cause the least disruption and obstruction to traffic and the least interference with surface drainage.

(b) Conduit Installed Under Roadway: Where conduit is to be installed under existing roadways or sidewalks, it shall be jacked or bored unless impossible to do so because of obstructions. In the event that obstructions are encountered during the course of jacking or boring, permission shall be obtained to make earth excavations for test pits to clear the obstruction. A minimum of two attempts shall be made to install conduit by the jacking or boring method and if unsuccessful, a final attempt shall be made changing the procedure and location (both horizontal and vertical), and if the final attempt fails, then permission may be given for the open cut method. Open cut installation in roadways shall only be performed with prior written approval from the Engineer.

When roadways are cut to install underground conduit, the cuts shall be restored to within 150 mm of the surface using high early strength concrete. Backfill in the remaining trench shall conform to the materials composition of the existing pavement. The outline of areas to be excavated shall be saw cut to a minimum depth of 51 mm prior to excavation. Cuts shall be neat and true with no shatter outside the removal area. The Contractor shall schedule the work so that each cut shall be restored properly, and that portion of the roadway shall be usable the following day. The width of cut shall not exceed 200 mm.

(c) Conduit Installed In Existing Facilities: At locations shown on the Plans, the Contractor is required to install new conduits in existing junction boxes, manholes, or pole foundations. At these locations, the Contractor shall modify the existing junction box, manhole, or pole foundation to allow the new conduit sweep(s) to enter the foundations as follows:

(1) Remove concrete by cutting, chiseling or any other method approved by the Engineer as required to install new conduit sweeps without damage to existing conduit(s). The Contractor shall repair any damage incurred at no cost to the project.

(2) After removing concrete, the area shall be washed with pressurized water at a minimum of 3,400 kPa and then thoroughly dried with compressed air.

(3) Position new conduit sweeps, and apply an approved concrete bonding compound on the exposed concrete surfaces as recommended by the manufacturer.

(4) Forms shall be positioned so that the profile of the existing foundation above grade will be matched.

(5) Foundations shall be restored to their original dimensions, by the use of a high strength grout.

If there are sufficient existing empty conduit sweeps available, it will not be necessary to modify the foundation. It shall be the Contractor's responsibility to obtain the Engineer's approval to use the existing sweeps.

(d) Conduit Connections: Rigid metallic conduit connections shall be accomplished using a threaded coupling of the proper size. Threads shall be clean cut, straight and true, and of sufficient length to permit proper coupling. A waterproofing compound shall be applied to each joint. Long running threads will not be permitted on any part of the work. Threads shall be protected in transit and during installation, and conduit shall be provided with proper supports and protection during construction to prevent damage. All ends of pipe installed for future connections shall be properly threaded, reamed and capped.

Where PVC conduit is to be connected to rigid metallic conduit or other existing conduit, a suitable manufactured adapter shall be used.

(e) Conduit Termination: Conduit terminating in controller cabinet foundations, pedestal bases, mast arm bases, manholes, and/or junction boxes shall be sealed with duct seal. Immediately after conduit installation, conduit outlets shall be temporarily capped to prevent water, earth and other foreign matter from entering the duct before being used.

Conduits terminating in controller cabinet foundations shall extend a minimum of 75 mm above the foundation. Conduits entering junction boxes from the bottom shall terminate not less than 75 mm, nor more than 100 mm, above the bottom of the box and near the box walls to leave the major portion of the box clear.

For conduit runs that terminate in pole bases, there shall be a separate outlet for each run of conduit entering the pole base. Conduit shall enter pole bases from the bottom or side and shall terminate in the center of the top of the foundation. Conduits terminating in pole bases shall extend approximately 38 mm above the foundation and shall be sloped toward the handhole opening. Conduits shall enter concrete manholes from the side and shall terminate flush with inside wall to leave the major portion of the manhole clear. Bell ends shall be used at conduit entrances to manholes and junction boxes.

1407.08 USE OF EXISTING CONDUIT: At locations shown on the Plans, the Contractor shall install new cable in existing conduit. At these locations, existing cable shall be removed from the conduit before the installation of the new cable. The conduit shall be cleaned and gauged as described in Section 1407.07. If the Contractor demonstrates to the Engineer that the existing conduit is damaged, unusable, or lacks the capacity to hold the proposed cable, the Contractor may install new conduit for which payment will be made at bid unit prices.

1407.09 MEASUREMENT AND PAYMENT:

(a) Conduit (Size Type) will be measured in meters and paid for at the contract unit price per meter. This price shall include all labor, equipment, and materials necessary to furnish and install conduit in accordance with the Plans and these Special Provisions.

This item will be measured by the number of meters of each type of conduit which have been furnished and installed. Vertical conduits connecting underground conduit segments with the bottom side of the CCTV cabinet will be considered incidental and no direct payment will be made. No direct payment will be made for conduit sweeps into cabinets, or conduit stub-ups

within junction boxes, controller cabinets, or other devices. Where the Plans call for an existing conduit to be intercepted and tied onto, direct payment will be made only for the meters of new conduit installed. Trenching and backfilling, and jacking under pavement associated with the conduit installation will be considered incidental and no direct payment will be made.

If the Contractor elects, for his own convenience, to install a larger size of conduit than that called for, payment will be made at the lower unit price (of the size called for and the size provided).

This item will be measured by the number of meters installed along a surface measured for the installation from center to center of junction boxes or other termination appurtenances.

(b) Traffic Manhole will be measured in units of each and paid for at the contract unit price per each. This price shall include furnishing and installing the manhole, including excavation, and furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.

(c) Junction Box (Type E) will be measured in units of each and paid for at the contract unit price per each. This price shall include furnishing and installing the junction box, including excavation, and furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.

1408
PAINTING and SURFACE FINISHING

1408.01 General: The Contractor shall be responsible for preparing and finishing all signal hardware surfaces installed under this Contract. The Contractor shall furnish the Engineer with a list of items to be painted, and no painting shall begin until this list is approved. All painting operations shall be conducted in accordance with the requirements of Section 811 of the Standard Specifications. Painting will be considered incidental and no separate payment will be made.

The Contractor shall be responsible for preparing and finishing all metal parts, fittings, pedestals, and mast arms associated with standard signal installations. The surface finish for these installations includes a combination coating of hot dip galvanizing and powder top coat. The Contractor shall furnish the Engineer with a list of items to be hot dip galvanized and powder coated, and no ordering of equipment shall begin until this list is approved. All combination coating operations shall be conducted in accordance with this Special Provision and will be considered incidental and no separate payment will be made.

1408.02 Type of Paint: These specifications are not intended to prohibit the use of paints of similar character but different composition. Substitute products must be equal to specified paints for all qualitative requirements applicable to their use. Substitute products must be approved by the Engineer. The approval of a product shall not relieve the Contractor of his obligations outlined in these specifications. Type of paint to be used shall be as follows:

(a) Primers:

(1) Chromate aluminum oxide coating process: Shall meet Government Specifications MIL-C-5541

(2) Epan Oxide Baking Primer: Shall meet Federal Specifications (FS) TT-P- 636.

(3) Zinc Chromate Primer: Shall meet FS P-735.

(4) Red Lead: Shall meet FS TT-P-86.

(5) Iron Oxide: Shall meet FS TT-P-36.

(b) Enamels: Gloss (Green): Shall be a high gloss alkyd enamel for exterior use and shall meet FS TT-C-595 Color No.14036. Color shall be standard Black Green by Spraylat Corporation, Product No. PRL96012, Control No. R8131. Color chips shall be furnished for approval before painting operations begin.

1408.03 Application: The preparation for finishing of new equipment shall be as follows:

(a) Standards, posts, pedestals and any other galvanized surfaces to be painted shall be cleaned and coated with the approved primer best suited for the surface. The traffic signal cabinets shall not be painted.

(b) If approved prime coat has been applied by the supplier, other than for repairs, prime coat will not be required.

(c) Standards and posts shall have at least two coats of Traffic Paint applied as follows:

(1) Standards with bracket mounted signals shall be painted in their entirety.

(2) All signal heads, signal head mountings, outside of hoods, back of back plates and housing shall have one or more coats of primer followed by two coats of Black Green Enamel.

(3) Louvers as specified, interior of signal hoods and fronts of back plates shall have one or more coats of primer followed by two coats of Lusterless Black Enamel. Factory enameled equipment and materials shall be examined for damaged paint after installation, and such damaged surfaces shall be repainted to the satisfaction of the Engineer. Factory-applied enamel finish in good condition and of appropriate color will be acceptable.

(d) Blast cleaning of galvanized metal surfaces in good condition, as determined by the Engineer, will not be permitted.

1408.04 Combination Coating - Galvanized/Powder Top Coat: The preparation for finishing standard signal equipment shall be as follows:

(a) Surface Preparation: Prior to being incorporated into an assembled product, steel plates 18.75 mm or more in thickness shall be blast cleaned when required to remove rolled-in mill scale, impurities and non-metallic foreign materials. After assembly, all weld flux shall be mechanically removed. The iron or steel product shall be degreased by immersion in an agitated 4.5% - 6% concentrated caustic solution elevated to a temperature ranging from 65 to 88 degrees Celsius. It shall then be pickled by immersion in a heated sulfuric acid solution of 6% - 13% concentration, with a controlled temperature between 65 to 88 degrees Celsius. It shall next be rinsed clean from any residual effects of the caustic or acid solutions by immersion in a circulating fresh water bath. Final preparation shall be accomplished by immersion in a concentrated zinc ammonium chloride flux solution heated to 54 degrees Celsius. The solution's acidity content shall be maintained between 4.5 - 5.0 pH. The assembly shall be air dried to remove any moisture remaining in the flux coat and/or trapped within the product.

(b) Zinc Coating: The product shall be hot-dip galvanized to the requirements of either ASTM A123 (fabricated products) or ASTM A153 (hardware items) by immersion in a molten bath of prime western grade zinc between 432 - 454 degrees Celsius. The entire product shall be totally immersed with no part of it protruding out of the zinc (no double dipping). This is to limit a risk

of trapped contaminates containing chlorides and reduce the risk of bare spots (bare spots can occur when flux on the steel surface is burned away by heat of the first dip). Maximum aluminum content of the bath shall be 0.01%. Flux ash shall be skimmed from the bath surface prior to immersion and extraction of the product to assure a debris-free zinc coating.

(c) Exterior Coating: All galvanized exterior surfaces shall be coated with a Urethane or Triglycidyl Isocyanurate (TGIC) Polyester Powder to a minimum film thickness of 2.0 mils. Prior to application, the surfaces to be powder coated shall be mechanically etched by brush blasting (Ref. SSPC-SP7) and the zinc coated substrate preheated to 232 degrees Celsius for a minimum of one hour in a gas fired convection oven. The coating shall be electrostatically applied and cured in a gas fired convection oven by heating the zinc coated substrate to a minimum of 176 degrees Celsius and a maximum of 204 degrees Celsius. The thermosetting powder resin shall provide both intercoat as well as substrate fusion adhesion that meets 5A or 5B classifications of ASTM D3359.

(d) Packaging: Prior to shipment, small poles shall be wrapped in 5 mm thick ultraviolet inhibiting plastic backed foam. Larger poles shall be cradled in 25 mm rubberized foam base.

1408.05 MEASUREMENT AND PAYMENT: No separate payment will be made for painting or combination coating of hot dip galvanizing and powder top coat.

1413
TESTING

1413.01 GENERAL: Testing of all equipment, and cable furnished and installed under this Contract shall be the responsibility of the Contractor and shall be conducted in the presence of the Engineer. The City reserves the right to perform any inspections deemed necessary to assure that the equipment conforms to the requirements specified herein. No separate payment will be made for testing.

1413.02 DEMONSTRATION TESTS: All equipment that is custom-made or modified for this project shall be subject to tests that demonstrate the suitability of the design and manufacturing procedures, unless an exception is granted by the Engineer. The tests shall be performed on a prototype made using the same materials and methods as will be used for the equipment to be delivered under this Contract.

Demonstration test procedures must be approved by the Engineer before any tests are conducted. The City review period will not exceed thirty days from receipt of the test procedures. The test procedure shall demonstrate all requirements defined in these Contract Documents, including but not limited to, functional/system performance requirements, electrical requirements, data transmission/communication requirements, safety/password requirements, environmental requirements, and interface requirements with other components of the system. The right is reserved to require the Contractor to rewrite the proposed demonstration tests at no additional cost to the project to correct deficiencies noted in the original version.

The City reserves the right to witness all demonstration tests. The City shall be notified a minimum of thirty calendar days in advance of such tests. Salary and travel expenses of the Engineer and his representatives will be the responsibility of the City. In case of equipment failures which make a retest necessary, travel expenses of the Engineer and his representatives shall be the responsibility of the Contractor. This shall include all costs associated with having two of the Engineer's representatives on site including, but not limited to, air fare, automobile rental, housing, and per diem. These costs, excluding air fare, shall not exceed $500.00, per representative, per day. These costs shall be deducted from the payments due or charged to the withholding account of the Contractor when the project is terminated.

The results of each test shall be compared with the requirements specified in the Contract Documents, and with the approved test procedures. Failure to conform to the requirements of any test shall be counted as a complete failure, and the equipment shall be rejected. Rejected equipment may be offered for retest provided all non-compliant items have been corrected and retested by the Contractor. Any corrections deemed necessary shall be complied with by the Contractor, at no additional cost to the City. The Contractor shall be totally responsible for documenting the results of such tests and furnishing the documented test results to the City.

The approval of test procedures and witness of such tests shall not relieve the Contractor of his responsibility to provide a completely acceptable and operating system that meets the requirements of these Contract Documents.

No equipment for which a demonstration test is required shall be shipped by a manufacturer without successful completion of demonstration testing, receipt of documented test results, and approval to ship.

1413.03 CABLE TESTS: The Contractor shall test all fiber optic cable, twisted pair cable, loop wire, detector lead-in cable, and optical detector cable. Twisted pair and optical detector cables shall be checked for continuity using a suitable tester before they are installed. More rigorous testing is required for fiber optic cable, loop wire, and detector lead-in cable, as described below.

(a) Fiber Optic Cable Tests: Fiber optic cable tests shall be performed on all cable while on the reel before installation, and after installation. All of the fibers shall pass these tests. Prior to installing the fiber optic cable, the Contractor shall conduct such tests as he deems appropriate to ensure that the cable is in good condition and meets the requirements of these Special Provisions.

Following the fiber optic cable installation, the Contractor shall test the entire length of each fiber in each cable using an optical time domain reflectometer (OTDR) at both 1310 nm and 1550 nm. The Engineer or his representative shall witness all OTDR tests. The Contractor shall give the Engineer durable, labeled plots of the results for each fiber, and shall also provide these plots on electronic media. If special software is necessary to view the results of the OTDR tests on a personal computer, two licensed copies of the software associated with these tests shall be provided to the City. The cost of this software shall be incidental to the testing. The Contractor shall also submit calculations demonstrating that the OTDR results for each fiber meet the attenuation requirements of these Special Provisions, and that the optical properties of the cable have not been impaired by the installation process.

If the OTDR results indicate that the cable, splices, or terminations do not meet the attenuation specifications, or if they indicate that the optical properties of the cable have been impaired during installation, then the Contractor shall, at his expense, take such action as the Engineer may approve to correct the problem. This may entail complete replacement of the fiber optic cable.

The Contractor shall, at a minimum, include the following documentation and tests in the fiber optic cable testing program:

- **List of test equipment.**
- **Cable attenuation measurements in both directions, including average link losses, for every fiber in every segment of every cable.**
- **Loss for each splice and connection.**
- **OTDR trace for each fiber with every event annotated.**

(b) Loop Wire and Detector Lead-In Tests: Before sealing the loop slots, the loop shall be tested with a megger in the presence of the Engineer and shall not have less than 100 megohms leakage to ground. A continuity test shall also be performed and the loop shall have a resistance of approximately six (6) ohms. If these tests are positive, the loop slot shall be sealed. All recordings shall be given to the Engineer.

The same tests shall be repeated after the slots have been sealed. If these tests are negative, the loop shall be replaced at the Contractor's expense.

After sealing the loop slots, the loop lead-in shall be connected to the controller cabinet terminal strip and tested in the presence of the Engineer with a test meter to insure that the combined loop and lead-in inductance is within the range of 60 to 490 microhenries. The loop and lead-in system shall also be tested with a megger and shall not have less than 10 megohms leakage to ground. A continuity test shall also be performed and the loop and lead-in shall have a resistance of approximately six (6) ohms.

If any of the above tests are negative, the loop and lead-in shall be replaced at the Contractor's expense. All recordings shall be given to the Engineer.

1413.04 MEASUREMENT AND PAYMENT: No separate payment will be made for testing.

Section 1414
LED Traffic Signals

Optical Unit: The optical unit shall be a 12in LED (light emitting diode). The Physical, Mechanical, Optical and Light Output, Electrical, Environmental, Production Testing, Documentation and Warranty Requirements are described in this section.

(1) General

The LED traffic signal module unit shall be designed for installation into specified traffic signal housing and shall not require special tools for installation. The 12in LED traffic signal modules shall fit into specified traffic signal housings without modifications to the housing.

Installation of an LED signal module shall be weather tight, fit securely in the housing; and shall connect directly to electrical wiring.

If proper orientation of the LED unit is required for optimum performance, prominent and permanent directional markings(s), that is an "UP arrow", for correct indexing and orientation shall exist on the unit.

The manufacturer's name, serial number, manufactured date and other necessary identification shall be permanently marked on the backside of the LED traffic signal module. A label shall be placed on the unit certifying compliance to ITE standards.

(2) Physical and Mechanical Requirements

The LED traffic signal shall be a single, self-contained device, not requiring on-site assembly for installation into traffic signal housing.

The unit shall be serviceable and repairable without the use of special tools. The LED module shall be constructed to allow the replacement of the outer lens and/or the light engine when needed. The external lens shall be smooth on the outside to prevent excessive dirt/dust buildup.

The assembly and manufacturing process for the LED signal assembly shall be designed to assure all internal LED and electronic components are adequately supported to withstand mechanical shock and vibration from high winds and other sources

Each LED traffic signal module shall comprise a UV stabilized polymeric outer shell, multiple LED light source, and a regulated power supply. LED are to be mounted on a polycarbonate positioning plate or conformally coated PC board. The external lens shall offer sun phantom protection to reduce driver glare or hot spot in sunlight

(3) Optical and Light Output Requirements

The LEDs shall be manufactured using AlInGaP (Aluminum-Indium-Gallium-Phosphorous) technology or other LEDs with lower susceptibility to temperature degradation than AlGaS (Aluminum-Gallium-Arsecic). AlGaS LEDs will not be allowed.

The number of each color and type of the LED signal module shall be specified in the plans. The modules shall be suitable for span wire and mast arm mounted signals.

The red and green modules shall be similar in appearance and visibility to an incandescent lamp. The red and green modules shall meet the minimum luminous intensity requirements in the following tables:

Minimum Luminous Intensity for LED Signal Modules

(Based on Kentucky Transportation Cabinet Department of Highways Division of Traffic Specification for LED Traffic Signal Modules for Expanded View)

GRID SPECIFICATION FOR 12IN RED

Shaded area is ITE requirements for light intensity

	27.5	22.5	17.5	12.5	7.5	2.5	-2.5	-7.5	-12.5	-17.5	-22.5	-27.5
22.5U												
17.5U					3	10	10	3				
12.5U					14	20	20	14				
7.5U					20	54	54	20				
2.5U					58	220	220	58				
2.5D			77	141	251	339	339	251	141	77		
7.5D	16	38	89	145	202	226	226	202	145	89	38	16
12.5D	16	22	34	44	48	50	50	48	44	34	22	16
17.5D	16	20	22	22	22	22	22	22	22	22	20	16
22.5D			7			10	10			7		
27.5D												

GRID SPECIFICATION FOR 12IN GREEN

Shaded area is ITE requirements for light intensity

	27.5	22.5	17.5	12.5	7.5	2.5	-2.5	-7.5	-12.5	-17.5	-22.5	-27.5
22.5U												
17.5U					7	20	20	7				
12.5U					27	41	41	27				
7.5U					41	108	108	41				
2.5U					115	441	441	115				
2.5D			154	283	501	678	678	501	283	154		
7.5D	32	77	178	291	404	452	452	404	291	178	77	77
12.5D	32	44	69	89	97	101	101	97	89	69	44	44
17.5D	32	41	44	44	44	44	44	44	44	44	41	41
22.5D			14			20	20			14		
27.5D												

The red and green modules are required to meet luminous values that are 115 percent greater than the required minimum values in the specification at time of production. The yellow modules shall meet Caltrans specifications for light intensity, and all other applicable ITE specifications. The LED arrow module shall have a full, filled profile, without the individual LED's being visible. The arrows shall meet all applicable ITE specifications, and Caltrans specifications on light intensity. Independent laboratory reports shall be supplied to verify modules meet the above requirements.

The red and green LED modules shall include a built-in "shut-off" feature, once the module's light intensity falls below ITE minimum requirements. Upon detection of this the circuit will disable any current generating circuitry within 100msec., to allow detection of this failure by conflict monitor and load switch. Also, any power supply failure will give an open circuit..

ARROW INDICATIONS (In candelas/m^2)

	Red	Yellow	Green
Arrow Indication	5,500	11,000	11,000

LEDs for arrow indications shall be spread evenly across the illuminated portion of arrow area. Arrow LED modules shall be tested in conformance with California Test 3001.

Measured chromaticity coordinates of LED signal modules shall conform to the chromaticity requirements of the following table, for a minimum period of 60 months, over an operating temperature range of -40_C to +74_ Each LED traffic signal lamp unit shall meet the minimum requirements for light output for the entire range from 80 to 135 volts.

Chromaticity Standards

Red	Y: not greater than 0.308, or less than 0.998x
Yellow	Y: not less than 0.411, nor less than 0.995-x, nor less than 0.452
Green	Y: not less than 0.506 – 0.519x, nor less than 0.150 + 1.068x, nor more than 0.730-x

LED signal modules tested or submitted for testing shall be representative of typical production units. Optical testing shall be performed with LED signal modules mounted in standard traffic signal section without visors or hood attached to the signal sections.

Photometric, luminous intensity and color measurements for yellow LED signal modules shall be taken immediately after the modules are energized. The ambient temperature for these measurements shall be 25_C. Test results for this testing shall record the current, voltage, total harmonic distortion (THD) and power factor (PF) associated with each measurement.

(4) Electrical

All wiring and terminal blocks shall meet the requirements of Section 13.02 of the VTCSH standard.

Each unit shall incorporate a regulated power supply engineered to electrically protect the LEDs and maintain a safe and reliable operation. The power supply shall provide capacitor filtered DC regulated current to the LEDs per the LED manufacturer specification. Design of the power supply shall be such that the failure of an individual component or any combination of components cannot cause the signal to be illuminated after AC power is removed. Any deviation without prior testing and approval from LADTOD shall be grounds for automatic removal from the LADOTD Bidding Qualifications for an undetermined time. The power supply must be current regulated.

The LED traffic signal module shall operate on a 60 Hz AC line voltage ranging from 80 volts RMS to 135 volts RMS with less than 10% light intensity variation. Nominal rated voltage for all measurements shall be 120 ± 3 volts rms. The circuitry shall prevent flickering over this voltage range. The current draw shall be sufficient to ensure compatibility and proper triggering and operation of load current switches and conflict monitors in signal controller units the procuring traffic authority customer has in use.

The LED traffic signal module shall be operationally compatible with TS1, TS2 and 2070 controllers, conflict monitors with plus features, and malfunction management units currently used by LADOTD and any other Louisiana government entities. In case of conflicts between specifications, the latest LADOTD specification will control.

The individual LED light sources shall be wired so that a catastrophic failure of one LED light source will result in the loss of only that one LED light source in the LED signal module. A circuitry that will shutdown the LED module and power supply when 85% ITE light intensity specifications are not satisfied shall be provided. The signal module on-board circuitry shall include voltage surge protection to withstand high-repetition noise transients and low-repetition high-energy transients as stated in Section 2.1.6, NEMA Standard TS-2, 1992.

Any deviation to product design after testing and approval from LADOTD shall consist of a new model and must be resubmitted for acceptance. Failure to adhere to this requirement shall be grounds for automatic removal from the LADOTD Bidding Qualifications for an undetermined time. Random testing of average production modules will be held to ensure compliance with specification.

Two capitive, color-coded, 36 in long 600 V, 20 AWG minimum, jacketed wires, conforming to the National Electrical Code, rated for service at +105°C, are to be provided for electrical connection.

LEDs shall be arranged in no less than 5 equally loaded circuits.

The LED signal shall operate with a minimum 0.90 power factor or greater at 25°C and at the nominal operating voltage.

. Total harmonic distortion (current and voltage) induced into an AC power line by a signal modules shall not excess 20 percent.

LED signal modules and associated on-board circuitry shall conform to the requirements in Federal Communications Commission (FCC) Title 47, SubPart B, Section15 regulations concerning the emission of electronic noise.

(5) Environmental Requirements

The LED signal module shall be rated for use in the ambient operating temperature range of -40°C to + 74°C.

The LED signal module shall be protected against dust and moisture intrusion per the requirements of NEMA Standard 250-1991, for Type 4 enclosures to protect all internal LED, electronic, and electrical components. Evidence of internal moisture after testing shall be cause for rejection.

(6) Production Testing Requirements

Each new LED signal modules shall be energized for a minimum of 24 hours, at 100 percent on-time duty cycle, in an ambient temperature of 60°C (+140°F) in order to cause any electronic infant mortality to occur, and to ensure electronic component reliability prior to shipment.

After burn-in, LED signal modules shall be tested for rated initial luminous intensity in conformance with the provisions in "Optical and Light Output Requirements." Before measurement, LED signal modules shall be energized at rated voltage, with 200 percent on-time duty cycle, for a time period of 30 minutes. Test results for this testing shall record the current, voltage, total harmonic distortion (THC) and power factor (PF) associated with each measurement.

(7) Documentation Requirements

Each LED traffic signal module shall be provided with the following documentation:

A. Complete and accurate installation wiring guide
B. Contact name, address, and telephone number for the representative, manufacturer, or distributor for warranty repair.
C. If requested by the purchaser, the bidders shall supply schematics for all electronics

A copy of a test report certified by an independent laboratory that the LED traffic signal module model submitted meets ITE Standards for light distribution, chromaticity and power (consumption, power factor and harmonic distortion) must be submitted.The tables in Section 3 of this specification replace the values in Table 1 of Section 4.1.1 of the ITE VTCSH. In addition, the independent lab report shall specify the drive current being supplied to individual LEDs within the unit. Designs that require LEDs to be operated at currents greater than the LED manufacturer's recommended drive current will not be allowed.

One schematic diagram shall be proficed for each LED module, along with any necessary installation instructions.

For each unit submitted, the manufacturer name, brand and model number fore LEDs used shall be provided, along with the LED manufacturer's recommended drive current and degradation curves.

(8) Warranty

LED signal module shall be warranted against any failure due to workmanship, material defects or intensity within the first 60 months of field operation. The LED module shall meet or exceed minimum luminous intensity values during the first 60 months of field operation.

A written warranty to provide the replacement or repair of LED signal modules that exhibit luminous intensity of less than the minimum values specified in Table 1 of ITE specification VTCSH-Part-2 July 1998, within the first 60 months from the date of delivery shall be provided.

Replacement LED signal modules shall be provided within 5 days after receipt of failed LED signal modules at no cost to the CITY, except the cost of shipping the failed modules.

CS-1: CONCRETE FOUNDATIONS, CS-2: PEDESTAL POLES, and CS-3: REMOVAL OF EXISTING SCHOOL FLASHER EQUIPMENT

CS-1: Concrete Foundations

(1) General: Concrete foundations shall be installed as needed for new flasher installations and for replacement of existing foundations as directed by the Project Engineer. This work shall include all necessary excavations, forming, placing of reinforcement steel, placing of anchor bolts, placing of ground rods, placing of conduits, pouring of concrete, neatly finishing exposed areas of concrete, backfilling, removing excess materials and cleaning up the work area when completed. This work shall also include sizing foundations for the support poles described herein. The Contractor shall furnish all materials and equipment to complete the installations.

(2) Ground Wire and Ground Rods: Ground rods shall be of copper-weld or an equivalent rust-resisting material of the length and diameter shown on Plans. Clamps for ground rods shall be copper. Ground wire shall be AWG No. 6 bare copper wire.

(3) Concrete: Concrete for bases shall be Class A concrete conforming to Section 901 of the Standard Specifications.

(4) Reinforcement Steel: Reinforcement steel shall conform to Section 806 of the Standard Specifications.

(5) Anchor Bolts: Anchor bolts for concrete foundations shall be provided by the Contractor and shall conform to the foundation detail drawings and specifications contained herein. Pedestal Pole Bases: Anchor bolts for pedestal bases shall be 19 mm by 450 mm. Four (4) anchor bolts are required per concrete base. Each anchor bolt shall be supplied with two nuts and two flat washers. The embedded end of anchor bolts shall have a 75 mm L bend, and the exposed end shall have a minimum of 100 mm of threads. Anchor bolts shall conform to ASTM-A36 and shall be galvanized to conform to ASTM-A153.

(6) Installation: The Contractor shall size foundations to support the total load presented at each location, including the pole, arm (where applicable), and signal heads. The foundations shall include conduit sweeps to accommodate all proposed conduits entering the pole, plus one additional spare conduit. Foundations shall be poured monolithically. Exposed portions shall be formed to present a neat appearance. The bottom of concrete foundations shall rest on firm undisturbed ground.

Forms shall be true to line and grade. Tops of footings for posts and standards, except special foundations, shall be finished at curb-to-sidewalk grade or as directed by the Engineer. Forms shall be rigid and securely braced in place. Conduit ends and anchor bolts shall be placed in proper position and to proper heights, and shall be held in place by means of a template until concrete sets.

Both forms and ground which will be in contact with the concrete shall be thoroughly moistened before placing concrete. Forms shall not be removed until the concrete has thoroughly set.

Ordinary surface finish shall be applied to exposed surfaces of concrete. When the edge of a concrete foundation or sidewalk section is within 450 mm of any existing concrete improvement, the sidewalk section shall be extended to meet said improvement.

Where obstructions prevent construction of planned foundations, the Contractor shall construct a foundation satisfactory to the Engineer whose price shall be full compensation for labor, equipment, materials and other necessary appurtenances required for a complete installation.

CS-2: Pedestal Poles

Pedestal poles shall be constructed in accordance with the City of New Orleans Standard details and as described below:

(7) Pedestal Poles: The pedestal base shall be constructed of cast iron or aluminum and shall be a minimum of 330 mm square at the bottom and a minimum of 380 mm high. The upper end of the base shall be threaded to accept a 115 mm O.D. pipe shaft. The pole shall be hot dip galvanized and powder coated in accordance with Section 1408.

The base shall contain a removable door to allow access to anchor bolts and to permit cable splicing. The door shall be a minimum of 200 mm X 200 mm and shall then be fastened to the base by means of a stainless steel hex head screw into a threaded hole in the base. The shaft shall be 100 mm standard steel pipe (108 mm O.D.) meeting ASTM Designation A53G.

The shaft shall be threaded on one end to screw into the base. The overall length of the pedestal (shaft plus base) shall be 3.1 m.

The pedestal shaft shall be installed plumb in all directions plus or minus 25 mm of the top. Shims will not be permitted on pedestal foundations to achieve plumbness. Pedestal bases shall be grouted with non-shrink grout after the shaft has been plumbed.

(1) Base Plate: Base plates shall conform to ASTM A36 or ASTM A572 Grade 42. Plates shall be integrally welded to the tubes with a telescopic welded joint, and shall be hot dip galvanized and powder coated in accordance with Section 1408.

(2) Pedestal Mounting. The pole shall be furnished with a slip fitter for placement on a 100 mm I.D. pipe pedestal with set screws for correct aligning of the signal. Provisions for base feed shall be incorporated into the design of the section assembly.

The section bracket assembly shall incorporate a weatherproof terminal compartment or box with a removable cover allowing complete access. The box shall be of suitable size to accommodate, and shall come equipped with, a terminal strip with terminals equal to the number of signal indications in the section plus one or more for common. The terminal compartment shall be neat in appearance and shall be adjacent

to or near the pedestal mount. In no case shall feed wires be required to pass through a signal section or face to reach the terminal compartment. A terminal compartment integral with the bracket shall be permitted.

CS-3: Removal and Salvage of Existing School Flasher Equipment

The Contractor shall remove school flasher equipment as needed for new installations and for existing locations as needed as directed by the Project Engineer. Equipment such as poles, signal heads, cabinets and/or flasher controllers shall be salvaged. Foundations, risers, field wire and cable which are removed and not reused shall become the property of the Contractor and shall be disposed of properly. Materials to be salvaged will remain the property of the City, and shall be transported by the Contractor to the Signal Shop, at 2832 Lafitte Street, New Orleans, Louisiana between the hours of 7:30 am and 3:00 pm, Monday through Friday. All materials to be salvaged shall remain in the custody of the Contractor until such time as they are delivered to the City.

The Contractor shall not damage any salvaged material and shall be required to, if requested, demonstrate to the Engineer that such material is indeed in working order. The Contractor shall restore or replace, at his own expense, any salvaged material which is damaged by his operations. All material shall be tagged with a label specifying the location from which the material was removed.

MEASUREMENT AND PAYMENT:

CS-1: Concrete Foundation - will be measured in units of each and paid for at the contract unit price per each. This price shall include fabricating, furnishing and installing foundation and miscellaneous hardware required for a complete installation.

CS-2: Pedestal Pole - will be measured in units of each and paid for at the contract unit price per each. This price shall include fabricating, furnishing and installing the signal support, including the pole, anchor bolts and plates, and miscellaneous hardware required for a complete installation.

CS-3: Removal and Salvage of Existing School Flasher Equipment - will be paid for at the contract unit price per each. The price shall include removal and salvage of all existing school flasher equipment as required and as described above; and storage and delivery of equipment to the Signal Shop, at 2832 Lafitte Street, New Orleans, Louisiana.

CS-4, COMPACT SOLAR SCHOOL ZONE FLASHER:

The contractor shall provide the Carmanah R829C Dual Compact Solar School Zone Flasher or Approved Equal:

Each unit shall consist of a self-contained solar engine, dual LED signal modules and signal housings, and mounting hardware such that the entire assembly mounts to the top of the pole. The solar engine shall contain all electronics, batteries & solar panels. No additional cabinet is required. The system shall conform to all provisions of the MUTCD, Chapter 4K, Flashing Beacons.

1.0 Mechanical Specifications

The solar engine shall be constructed from powder coated aluminum, and shall be no greater in size than 4.75" x 15" x 15". The Solar panel shall be integrated to the solar engine. All batteries and electronics shall be mounted in the solar engine, with no external control cabinet or battery cabinet required. The solar engine shall be vented to provide cooling of the battery and electronic system. Venting shall be covered by wire mesh to prevent intrusion of insects.

The solar engine shall have the provision to mount an external device for remote activation. System must have capability to power such device. Solar engine must contain sufficient space to house third party device inside a sealed enclosure located inside the solar engine.

The overall weight of the assembly, including mounting hardware, signal housing, LED module, and solar engine shall not exceed 55 lbs.

The solar engine shall have the provision to be tilted and oriented south with additional mounting hardware, or mounted completely flat to the ground such that mounting in any orientation will keep the solar engine level.

1.1 Mounting

The entire assembly, including solar engine, signal housing and LED module, and bracket shall be provided with hardware for mounting on to the top of a 4 1/2" diameter round pole. Mounting hardware shall be standard traffic signal mounting hardware manufactured by Pelco Products Inc, or approved equal.

1.2 Solar / Battery System

The solar engine shall include one 10-watt solar panel no larger than the footprint of the housing. The solar engine shall house a single, field replaceable sealed lead acid battery no greater than 24 Ah. Solar panel and battery system shall be 12 Volt DC.

The solar panel shall meet the design qualification and type approval of photovoltaic modules in accordance with IEC 61215. This specification includes radiation testing, thermal testing, and mechanical testing for environmental conditions such as UV-exposure, thermal cycling, as well as degradation of maximum power output.

The solar panel shall consist of one single solar panel, mounted to the solar engine with an aluminum flashing.

Battery shall be mechanically secured into the housing. Battery bracket shall enclose the battery in a manner to restrict the thermal expansion of the battery.

System shall have an auxiliary 12 VDC power output to power third party devices such as wireless radios or sensing equipment.

1.3 Signal Housing

The signal housing shall meet the equipment standard of the Institute of Transportation Engineers (ITE) Vehicle Traffic Control Signal Heads (VTCSH) Chapter 2.

The solar engine shall not overhang the signal head, so as not to restrict mounting a signal head back plate. The signal head shall be easily removable from the assembly. The bracket assembly shall be constructed such that the signal heads can be removed easily in the field without removing the solar engine. The bracket assembly shall be designed to take the torsion and bending load of the solar engine. The signal head shall not be subjected to the torsional or bending load of the solar engine.

The signal housing must be able to rotate independent from the bracket for lens alignment.

1.4 LED Signal Module

The LED signal module shall conform to the mandatory specifications of: ITE Vehicle Traffic Control Signal Heads, Light Emitting Diode (LED) Circular Signal Supplement as required by the Manual of Uniform Traffic Control Devices 2003 Edition Revision 1.

2.0 Operational Specifications

The system shall conform to all standards for flashing beacons as required in the Manual of Uniform Traffic Control Devices 2003 Edition Revision 1 or current version.

The beacon shall be flash at a rate of not less than 50 nor more than 60 times per minute. The illuminated period of each flash shall not be less than one-half and not more than two-thirds of the total cycle.

The beacon shall have a night dimming feature.
The beacon shall have a minimum operating autonomy of 30 days.
The beacon shall automatically reduce light output in case of low battery situations, reducing risk that the beacons will fail entirely under conditions of poor solar insolation.

3.0 Activation

The beacon shall be activated by an integrated, programmable microcontroller. The beacon shall store 500 days of flash data. The software must allow for a minimum of seven distinct usage programs to allow for different usage variations from that of a standard school day. The activation schedule shall be uploaded by a customer provided laptop running MS Windows 98, 2000, or XP.

The beacon shall have the option to be activated by a third party programmable time switch device such as the CPR2102 Pager Programmable Time Switch. The programmable time switch shall be housed in a sealed enclosure that is mounted inside the solar engine or alternatively in an external enclosure.

4.0 Environmental Specifications

The system should be able to withstand and operate at temperature extremes of -40 deg F to +122 deg F.

The system shall be designed and constructed to withstand 178 Km/h (110 mph) wind loads in conformance with the requirements of the AASHTO publication, "Standard Specifications for Structural Supports of Highway Signs, Luminaries and Traffic Signals", 4th Edition 2001.

The electronic circuit board housing, wire harnessing and connectors shall be designed and tested in accordance to IEC International Standard 60529, Ingress Protection IP67 requiring that the enclosure be dust tight and remain completely sealed when immersed in water to a depth of 1 meter for 1 hour.

The LED Module shall meet the following environmental tests as specified in the ITE Vehicle Traffic Control Signal Heads, Light Emitting Diode (LED) Circular Signal Supplement:

Mechanical vibration: MIL-STD-883
Temperature cycling: MIL-STD-883
Moisture resistance: MIL-STD-810F.

5.0 Electrical Standards

Integrated solar charger shall be approved to CSA and UL standards.

6.0 Quality Assurance

The product must be FCC certified to comply with all 47 CFR FCC Part 15 Subpart B Emission requirements.

The system, including battery pack, solar panel, LED module and all components, shall be guaranteed for a minimum of three years.

Manufacturer must be ISO 9001 certified.

MEASUREMENT AND PAYMENT:

CS-4: Remove and replace Compact Solar School Zone Flasher- will be measured in units of each and paid for at the contract unit price per each. This price shall include removing the existing flashing beacons and fabricating, furnishing and installing the flasher and miscellaneous hardware required for a complete installation of new solar school zone flashers.

CS-5: TIME SWITCH WITH ANTENNA

Radio/WiFi/LAN-Ethernet Annual Programmable Time Switch or Approved Equal

This specification sets forth the minimum acceptable design requirements for annual programmable solid state time switch that is programmable using two way Radio/WiFi/LAN-Ethernet technology. The time switch shall be capable of receiving and sending programming to/from a central computer over any combination of 900MHz Spread Spectrum Radio, Wireless WiFi and LAN-Ethernet (fiberoptic or copper wire). The time switch shall also be programmable from a laptop computer, a Palm OS or Windows Mobile PDA using a serial cable and/or a BLUETOOTH wireless adaptor. The time switch shall use day plan programming with the annual exception method for ease of programming.

1.0 NEMA Certification

The time switch shall be certified by an independent testing agency as meeting the NEMA environmental specifications TS 2-2003 v02.06. A copy of the certification document shall be submitted with all bids.

2.0 Physical

The time switch shall be equipped with a means for mounting to a suitable back plane. Mounting holes that provide clearance for at least a No. 10 screw will be acceptable.

The time switch shall not exceed 8 3/8"h x 4 7/8"w x 2"d without harness and 10 3/8"h x 4 7/8"w x 2"d with harness. A case shall be provided to protect the time switch circuitry from dust. The unit shall fasten securely to the case and must be easily removable from the case with the use of simple tools.

Interface to the power source (AC or DC) and to the controlled device shall be provided by means of a quick disconnect connector with a 48" mating harness. The AC and DC power inputs shall be protected with a fuse and MOV.

3.0 Power Supply and Timing

The time switch shall operate on either 12 Volt DC +/-2VDC or an AC power source between 95 and 135 VAC and from -30 to +74 degrees C.

The AC & DC power supply shall be an integral part of the time switch circuit board for operation in AC powered or solar DC powered systems. A separate 12VDC power supply module, similar to those used for calculators and battery chargers, is not acceptable.

No time shall be gained or lost during changeover from AC power to the back-up system and back to AC power.

4.0 Radio Antenna

The time switch unit shall be supplied with either a 10db gain 7 element Yagi antenna or a 6db gain Omni antenna depending on the application. Both antennas shall be designed to work in the frequency range between 902MHz and 928MHz. A 6db gain Omni antenna shall be supplied if the time switch is to be configured as a repeater site. A 10db gain 7 element Yagi antenna shall be supplied if the time switch is to be configured as a remote site. A mounting bracket suitable for side-of-pole banding to a 4.5" OD pole shall be supplied with each antenna. A coax cable shall be supplied with each antenna. The coax cable shall be a minimum of 23' long. One end of the coax cable shall have a connector for connecting to the appropriate antenna and the other end of the coax cable shall have a connector for connecting to the time switch.

5.0 Radio/WiFi/LAN-Ethernet Programmable Time Switch

The time switch unit shall have a radio or WiFi transceiver that is able to receive programs and commands generated by a central computer and transmit its programming data back to the central computer upon demand.

The Radio/WiFi/LAN-Ethernet transceiver shall work as a wireless RS-232 connection for the time switch. When the Radio/WiFi/LAN-Ethernet transceiver receives a message it will pass the message to the time switch for decoding. All addressing, timing and on/off command decisions shall be made by the time switch and not by the Radio/WiFi/LAN-Ethernet transceiver.

The time switch shall be capable of receiving and running the following programs via the Radio/WiFi/LAN-Ethernet network:

6.0 Day Plan Programming

Each time switch shall have ten (10) day plans. One of the Day Plans shall be used for holidays throughout the school year. The other nine Day Plans shall be capable of programming 16 program steps per plan. Each day plan program step shall include the following:

Time of day in: Hours, Minutes, AM or PM

ON / OFF Commands: ON
OFF

One day plan shall be reserved for programming a normal school day and the other 8 day plans are programmed for any school flasher schedule other than the normal school day such as an early out schedule.

Means shall be provided to allow the operator to clear the programming of a single Day Plan or all of the Day Plans by simple keystrokes.

7.0 Week Plan Programming

Each time switch shall have a Week Plan. The Week Plan is the normal Monday through Friday school program. The time switch shall automatically assign Saturday and Sunday to no Day Plan, and Monday through Friday to the Normal Day Plan. The operator shall have the ability to reprogram any day of week in the Week Plan to any other Day Plan.

8.0 Annual Plan Programming

The time switch shall be capable of executing thirty-six (36) separate Annual Plans. The Annual Plan programming shall use the exception day method where the time switch automatically runs its Week Plan until an Annual Plan program instructs it to run a different day plan.

Programming for the Annual Plans shall be accomplished through the integral keyboard. Each Annual Plan shall be programmed by entering a Day Plan number and the beginning date (month/date/year) and the ending date for which the time switch is to run that Day Plan. The time switch shall be capable of running a Day Plan as short as one (1) day or as long as six (6) months. It shall be possible to begin an Annual Plan in one calendar year and end that same Annual Plan in the next consecutive year.

It shall not be necessary to enter the Annual Plans in chronological order.

Means shall be provided to allow the operator to clear all of the data in the Annual Plans without affecting the operation of the time switch.

A means shall be provided to review the Annual Plans without affecting the normal operation of the time switch. The display shall include the Annual Plan number, the Day Plan number, and the beginning and ending dates.

9.0 Keyboard Programming

Programming shall also be accomplished via a 16 key positive action push button keyboard which is an integral part of the unit. Prompt messages shall be displayed during the programming process to guide the operator as the data is being entered.

The time of day shall be able to be set to one second.

Time of day, day of week, date, year and the operation of the 2 relay outputs shall be able to be easily set from the integral keyboard. The functions of the keys shall be clearly marked on the keypad. Prompt messages shall be displayed during the programming process to guide the operator as the data is being entered. All data required to properly set and program the unit and review the stored program shall be clearly displayed without the use of auxiliary devices.

Changeover from standard time to daylight savings time or vice versa shall be accomplished automatically. The operator shall have the capability of entering the daylight savings time information from the keyboard thus eliminating the need for a PROM change should the current U.S. law change. The daylight savings time feature shall be able to be defeated from the keyboard. Leap year compensation shall be automatic.

When the user is programming the unit, the display shall provide for verification of each piece of data prior to its being entered. Provision shall be made for correction of any incorrect data prior to entering it. It shall be possible to alter any individual program step without disturbing any other step in the program.

When an instruction is given to turn the output/s on or off, that instruction time shall be able to be set to one minute, and the change shall take place at the zero second of that minute.

A set of clear operating instructions shall be furnished with each time switch.

A software package shall be available that will allow the operator to upload programming and download programming to the time switch from a laptop, BLUETOOTH enabled Palm PDA or BLUETOOTH enabled Windows Mobile PDA. The

programming shall include all day plans, week plan, annual plans and a unique name assigned by the operator. The software shall be able to store the programming for an unlimited number of time switches.

10.0 Program Transfer

It shall be possible to program any time switch, and transfer that program to any other like time switch by means of a simple unit-to-unit cable. Upon completion of the program transfer, an electronic check shall be activated to insure an accurate transfer of data. In the event an invalid transfer occurs, an error message shall be displayed alerting the operator. The transfer cable connection shall be accessible from the front of the time switch.

11.0 Manual Operation

The time switch shall have the capability of manually turning on or off the two relay outputs from the integral keyboard. The manual operation shall remain in effect until the next valid program step occurs. At that point the time switch will release from manual control and revert to its internal program.

The main display of the time switch shall indicate when the unit is under manual control.

12.0 Display

Integral with the time switch shall be an easy to read, 2 line, 16 characters per line, alphanumeric Liquid Crystal Display (LCD). This display shall provide a clear indication of the time of day (HH:MM:SS), AM or PM, day of week, date (MM/DD/YY) and the status of the output relays. Time shall be entered on a 12 hour format with a clear indication of AM or PM.

The operator shall be able to display the current status of the time switch with simple keystrokes. This status screen shall include which Day Plan and Annual Plan numbers are in effect.

A means shall be provided to review the program in the unit's memory, and such means shall be integral with the time switch. Such program review shall not affect the current operation of the time switch.

13.0 Back-up System

A means shall be provided to maintain timekeeping when the line power source (115VAC) is not available. This back-up system shall maintain timekeeping for not less then 48 hours at 25C. Upon resumption of the line power, the unit shall automatically resume normal operation.

A means shall be provided to maintain the time switch program when the line power source (115VAC) is not available. This back-up system shall maintain all programmed steps intact for not less then 6 months at 25C. Upon resumption of the line power, the unit shall automatically resume normal operation.

When the time switch is operating on the back-up system, the displays shall be blanked and the outputs disabled to conserve back-up power.

14.0 Outputs

The time switch shall have two (2) single-pole, double-throw relay output with a contact rating of at least 15 amps at 115 VAC resistive load. While functioning as a stand alone time switch, each relay output shall operate independently. While functioning in a wireless network, both relay outputs shall operate as one.

15.0 Warranty

Each unit shall be warranted to be free from defects in material and workmanship for a period of one year from installation date or fifteen (15) months from the date of shipment from the date of shipment from the factory, whichever occurs first.

Any warranty service required shall be promptly performed at the manufacturer's facility or the manufacturer's authorized service agency. The purchaser will pay transportation costs to such service point, and the manufacturer will pay those costs to return the unit by normal surface transportation means.

16.0 Test and Acceptance

The apparent low bidder shall be required to supply a complete working system to the agency for testing and evaluation. This working system shall include a computer preloaded with the software, a Radio/WiFi/LAN-Ethernet transceiver for the computer, six-field time switch units, a Palm OS or Windows Mobile PDA and any other equipment or supplies necessary for the agency to adequately test and evaluate the system.

The bidder shall setup the computer and the six field time switch units at a location identified by the agency. The bidder will train agency personnel on how to program and operate the Radio/WiFi/LAN-Ethernet programmable time switch system. The test and evaluation will take up to 60 days at which time the equipment may be picked up by the bidder or shipped to the bidder freight collect.

Upon telephone or written notification, the bidder must deliver this equipment to the agency within 14 calendar days. Failure to comply with the above requirement will render the bid non-responsive.

MEASUREMENT AND PAYMENT:

CS-5: Time Switch with Antenna - will be measured in units of each and paid for at the contract unit price per each. This price shall include fabricating, furnishing and installing the time switch with antenna and miscellaneous hardware required for a complete installation.

CS- 6, CPR RADIO REPEATER - SOLAR POWERED CABINET ASSEMBLY:

This specification outlines the minimum acceptable design requirements for a radio repeater cabinet assembly. Each cabinet assembly will be used to operate a radio transceiver 24 hours a day. Power for the repeater cabinet assembly shall be supplied by a 12 volt battery that is charged from the sun's energy.

1.0 Interface Circuit Board

The cabinet assembly shall include an interface board. The interface board shall have two terminal blocks for connecting the wiring of the cabinet. Barrier type terminal blocks shall be used to terminate all wires. The terminal blocks shall terminate the following functions:

1. Solar Panel +
2. Solar Panel -
3. Battery +
4. Battery -
5. Not used this application
6. Not used this application
7. Not used this application
8. Not used this application
9. Not used this application
10. Not used this application

1. Time switch relay common (if used)
2. Time Switch relay normally open (if used)
3. DC + power to time switch (is used)
4. DC – to time switch (if used)

The above functions shall be clearly silk screened on the circuit board adjacent to the appropriate terminal.

The interface board shall be pre-wired for connection to a solar regulator. The wires connecting interface board to the solar regulator shall be a minimum of 16AWG and shall be permanently soldered to the interface board.

The interface board shall be pre-wired with a 16-position, CPC type, quick disconnect connector to accommodate a CPR 2102 Time Switch and the radio repeater. The time switch connector shall be wired as follows:

Pin 4: Relay common
Pin 10: Relay normally open
Pin 13: DC common
Pin 15: DC +

The interface board shall include 3 separate fuses to protect the solar array, the battery and the load. The fuses shall be easily replaceable from the front of the board with the use of a standard fuse removal tool.

2.0 Solar Regulator

The repeater cabinet shall include a solar regulator. The solar regulator shall be 100% solid state and be designed for use as a battery charge regulator in photo voltaic (solar) energy systems.

The solar regulator will allow maximum solar panel current to flow into the battery until the battery voltage reaches the charge termination set point. When the battery voltage drops to the charge resumption set point, the solar regulator will allow charging to resume.

The solar regulator shall have terminals to accept the wires from the interface board.

The solar regulator shall have two LED indicators. One LED indicator shall be on when the solar array is charging the battery and off when the solar array is not charging the battery. The second LED shall be off during normal operation and on when the solar regulator has disconnected the load due to a low voltage battery of 11.5 volts (low voltage disconnect). The solar regulator shall automatically reconnect the load if the battery voltage level reaches 12.6 volts.

The solar regulator shall be configurable to work with both sealed and flooded batteries. It shall be possible to switch between sealed and flooded with the use of simple tools.

3.0 Solar Array Module

The solar array shall be rated at 20 watts at 16.5 Vmp and with a 1.22 Imp. The array shall contain 36 solar cells connected in series. The glass surface is to be impact resistant and allow maximum light transmission. The frame shall be made of anodized aluminum and shall mount to the top of the cabinet. A weather resistant junction box shall accommodate all wiring methods including moisture-tight strain relief and electrical conduit. The module shall have a 20-year, 80% power output manufacturer's warranty.

4.0 Cabinet

The cabinet shall have a hinged panel for mounting the repeater radio, the time switch, the interface board and the solar regulator. The cabinet shall be designed to mount a time switch with dimensions of 10 3/8"h x 4 7/8"w x 4"d with the CPC connector.

The cabinet shall be fabricated of .125 inch sheet aluminum. The cabinet shall be weatherproof using a neoprene gasket and shall be supplied with a standard #2 corbin lock and key. The cabinet shall be of sufficient size to house one (1) 100-amp hour battery. The outside dimensions of the cabinet shall be a minimum of 17"h x 18.5"w x 14.75"d. The outside of the cabinet shall be the natural aluminum finish.

The cabinet shall have a rain flap designed to cover the top of the cabinet door. The rain flap shall extend the width of the cabinet and shall be 1.75" deep. The rain flap

shall have a slight down angle and extend past the door of the cabinet when the door is closed to allow rain water to drip past the opening of the cabinet door.

In order to allow battery gasses to escape, the cabinet shall be equipped with vents on the left and right side of the cabinet. The vents shall be covered on the inside of the cabinet with a screen to prevent insects and other debris from entering the cabinet.

5.0 Radio Repeater with Time Switch

The repeater assembly shall have a radio transceiver that is able to receive and transmit its programming to and from a master radio or another repeater radio. The radio repeater shall connect to a time switch that provides addressing for the repeater assembly and power to the radio repeater.

6.0 Radio Repeater

Each repeater assembly shall have a radio transceiver. The radio transceiver shall be frequency-hopping spread spectrum designed for license-free operation in the 900MHz ISM band. The radio shall be equipped with an RS-232 serial port and shall have a power output of 1000mW.

The radio shall receive its power directly from the time switch and shall not consume more than 400ma at 12VDC. A separate power supply module, similar to those used for calculators and battery chargers, is not acceptable.

The radio shall not exceed 4.4" x 2.7" x 1.4" and shall be designed to operate from -40 to +80 degrees C.

7.0 Antenna with Mounting Hardware

Each repeater assembly shall be supplied with an external antenna. The antenna shall have a minimum gain of 6dbd, shall be omni directional and shall be supplied with hardware for side-of-pole mounting. The antenna shall have a minimum of fifty feet of LMR400 coax cable to accommodate mounting the antenna at the top of the pole assembly. Connectors shall be installed on the coax cable for connection from the antenna to the radio transceiver.

8.0 Connector

Each time switch shall be equipped with a circular CPC type connector appropriately wired for installation in the repeater assembly cabinet.
CRC Error Checking

To eliminate the possibility of receiving a corrupted radio message, the time switch firmware shall include an algorithm that generates a "Cyclic Redundancy Check" (CRC) error-checking character set for each radio message received. If the time switch CRC

character set does not match the CRC character set received over the radio network, the time switch shall ignore the message.

9.0 Radio Repeater Time Switch Addressing

It shall be possible to program a unique address on each radio repeater time switch board by setting two DIP switches. One DIP switch shall be used to set the group address (01-99) and another DIP switch shall be used to set the location address (01-99). This unique address will allow the operator to identify each radio repeater to confirm that all radio repeaters are operating properly. An LED indicator shall continuously display the group and location number once the DIP address has been set.

10.0 Indicators

The radio repeater time switch shall have a minimum of four (4) LED indicators to display the following:

When the radio repeater time switch has power applied and is operating,
When the radio repeater time switch is in the process of receiving a radio signal,
When the radio repeater time switch has failed to receive a radio signal after midnight Saturday,
When the output relay is energized or de-energized,
When an address DIP switch setting error has been made,

11.0 Enclosure

The radio repeater time switch shall be housed in an aluminum enclosure with a means for mounting to a suitable back plane. Mounting holes that provide clearance for at least a #10 screw is required. The mounting hole pattern of the enclosure shall be the same as existing time switches used by the agency to facilitate easy installation.

The time switch shall not exceed 3.7"w x 7.5"h x 1.55"d. Interface to the repeater cabinet shall be provided by means of a terminal block capable of terminating wires sizes up to #14 AWG. The DC power input to the time switch shall be protected with a fuse.

12.0 Compatibility

It is the CONTRACTOR'S responsibility to verify with the software provider for item CS-7: "Master Radio, Central Office Computer and System Software" that the radio equipment is compatible with the software, that the two can communicate and that all aspects of the software will be operational using the radio equipment provided.

13.0 Warranty

Each repeater cabinet assembly shall be warranted to be free from defects in material and workmanship for a period of one year from installation or fifteen (15) months from the date of shipment from the factory, whichever occurs first.

Any warranty service required shall be promptly performed at the manufacturer's facility or the manufacturer's authorized service agency. The purchaser will pay transportation costs to such service point, and the manufacturer will pay those costs to return the unit by normal surface transportation means.

MEASUREMENT AND PAYMENT:

CS-6: CPR Radio Repeater – Solar Powered Cabinet Assembly - will be measured in units of each and paid for at the contract unit price per each. This price shall include fabricating, furnishing and installing the time switch with antenna and miscellaneous hardware required for a complete installation.

CS-7: MASTER RADIO, CENTRAL OFFICE COMPUTER AND SYSTEM SOFTWARE

This specification sets the minimum acceptable requirements, materials, and workmanship for a Radio/Wi-Fi/LAN-Ethernet Programmable Time Switch System that is activated using two-way Radio/Wi-Fi/LAN-Ethernet technology. The system shall be capable of uploading and downloading time switch programming from a central computer over any combination of 900MHz Spread Spectrum Radio, Wireless Wi-Fi and LAN-Ethernet (fiber optic or copper wire).

1.0 Master Radio

A CPR Radio Repeater to serve as the Master Radio at the location of the Central Office Computer is to be provided by the Contractor. The Master Radio should meet or exceed the technical specifications outlined in CS-6 "CPR Radio Repeater - Solar Powered Cabinet Assembly". It is the CONTRACTOR'S responsibility to verify with the software provider that the radio equipment is compatible with the software, that the two can communicate and that all aspects of the software will be operational using the radio equipment provided.

2.0 Software and Computer Configuration

The Radio/Wi-Fi/LAN-Ethernet Programmable Time Switch System software shall be capable of operation on a central office computer running Windows™ XP pro. The software shall be user friendly and intuitive in format and shall employ a "Windows" style interface and shall include suitable prompts and verifications as well as help screens.

The computer used for the Radio/Wi-Fi/LAN-Ethernet Programmable Time Switch System shall provide at least the following:

PC running Windows™ XP pro.
1 GB RAM
40 GB hard drive space.
DVD drive.
Monitor (1024 x 768) or better.
Mouse and Keyboard
B&W Laser Printer
COM port for possible use by the radio transceiver.
LAN (Ethernet) connection.
UPS power supply.

The Radio/Wi-Fi/LAN-Ethernet Programmable Time Switch System shall operate from any combination of 900MHz spread spectrum radios, wireless Wi-Fi and/or LAN-ethernet to form a wireless RS-232 network. The wireless RS-232 network shall have the capability of 2-way communication with any individual time switch. The wireless RS-232 network shall also have the capability of downloading information to all of the time switches for a particular school, and to all time switches throughout the network.

3.0 Master Group Programming

The software shall be capable of programming up to 10 Master Groups. Each Master Group shall be comprised of 99 Sub Groups. Each Sub Group shall be programmable to accommodate the daily, weekly and annual schedule of the flashing beacons around one school or school zone. The system shall be capable of programming a total of 990 individual schools or school zones.

The Master Group number shall appear at the top of each program screen that is Master Group specific.

4.0 Sub Group Programming

The software shall be capable of programming up to 10 Master Groups each with up to 99 Sub Groups. A sub group will be comprised of time switch locations that share common daily, weekly and annual programs, typically for controlling flashing beacons around one school or school zone. Each Sub Group shall be capable of accommodating up to 99 different time switch location addresses. The programming of each Sub Group shall include an alphanumeric name and group number that is selected by the user from a list of available Sub Group numbers.

One button shall be provided for adding a Sub Group to a master group and a separate button shall be provided for editing a Sub Group. The add feature shall allow the operator to enter a new Sub Group name and select a Sub Group number from a list of available Sub Group numbers. The edit feature shall allow the operator to change an existing Sub Group name, change a Sub Group number, and delete a Sub Group. If a Sub Group is deleted, or if the number of a Sub Group has been changed, the deleted and changed numbers shall be added back to the list of available Sub Group numbers. This feature will eliminate the possibility of inadvertently making a program change.

The software shall allow the operator to list the Sub Groups by name, and list the Sub Groups by number. Print capability shall be provided when listing the Sub Groups by name or number.

5.0 Location Programming

Each Sub Group (see above) shall be capable of accommodating up to 99 different time switch location addresses. The programming of each location shall include the location name, location type, sub group number and a unique location ID number. The software shall allow the operator to assign a unique location ID number. Each new location type shall be automatically added to a pull down list, eliminating the need to reenter the same location type more than once.

One button shall be provided for adding a location and a separate button shall be provided for editing a location. The add feature shall allow the operator to enter a new

location name, location type and select a location number from a list of available location numbers. The edit feature shall allow the operator to change an existing location name, location type, change a location number, and delete a location. If a location is deleted, or if the number of a location has been changed, the deleted and changed numbers shall be added back to the list of available location numbers. This feature will eliminate the possibility of inadvertently making a program change.

The software shall allow the operator to list the locations by name, by type and by sub group. Print capability shall be provided when listing the locations by name, type or sub group.

6.0 Day Plan Programming

Each sub group described above shall have up to twenty (20) day plans with 24 program steps per plan. Each day plan program step shall include the following:

Time of day: Hours, Minutes, AM or PM

ON / OFF Commands: ON
OFF

A list of the program steps shall be displayed on the screen as the day plan program is being entered. The operator shall be able to access any of the program steps that are displayed for editing.

One of the day plans shall be reserved for programming a normal school day. The operator shall have the option of entering a name for each of the other day plans such as Early Out, Football, Summer School, etc. This feature immediately identifies each day plan's function. The operator shall have the ability to edit or delete any day plan name. Each new day plan name shall be automatically added to a list, eliminating the need to enter the same name more than once.

Provisions shall be made to edit or delete any day plan step. It shall also be possible to copy the program from any day plan to any other day plan, and copy from any sub group to any other sub group. Print capability shall be provided for any sub group and day plan combination including the day plan name.

Over the Radio/Wi-Fi/LAN-Ethernet network, it shall be possible to manually send default week plans to any or all sub groups of time switches. It shall also be possible, over the Radio/Wi-Fi/LAN-Ethernet network, to manually re-send any alternate week plans that are currently running.

The day plan program screen shall include an "Error Check" button. When clicked, this button shall search all of the day plans for errors in the program. An error is defined as one of the following conditions:

ON command followed by an ON command,
OFF command followed by an OFF command,
A sub group having more than one day plan with the same name.

The error check display will tell the operator the sub group name, the day plan number, a description of the error found and the step numbers where the error occurs.

7.0 Default Week Plan Programming

Each Sub Group shall have a Default Week Plan. The Default Week Plan is the normal Monday through Friday school program for a Sub Group.

The system shall automatically program Saturday and Sunday to no Day Plan, and Monday through Friday to the Normal Day Plan. The operator shall have the ability to change any day from the Normal Day Plan to any other Day Plan programmed for that Sub Group.

8.0 Annual Plan Programming

The software shall be capable of executing an unlimited number of holiday plans, day plans and vacation plans. A holiday plan shall be used for single days where the time switch/s are not to operate (i.e.: school holiday). A day plan shall be used for days where the time switch/s are to operate according to a day plan other than the Normal Day Plan (i.e.: early out). A vacation plan shall be used for multiple days where the time switch/s are not to operate (i.e.: summer vacation, winter vacation, spring break, etc.).

The software shall display a 15-month calendar on the screen without having to scroll. The calendar shall start with the current month set in Windows™. Each holiday plan and day plan shall be programmed by selecting a day from the calendar. Each vacation plan shall be programmed by selecting individual start and end days from the calendar.

In addition to the calendar display, the annual programming screen shall provide a list of all of the master groups and the sub groups for each master group programmed into the system. When the operator selects a sub group, the screen shall display the following information specific to that sub group:

Holiday Plan,
Vacation Plan,
All day plans with their assigned names.

It shall not be possible to select a day prior to the date set on the computer or program more than one holiday plan and/or day plan for the same day.

When a day on the calendar is programmed for a holiday plan, that day shall be highlighted with the letter H displayed. When a day on the calendar is programmed for a day plan, that day shall be highlighted with the day plan number displayed.

The operator shall select the start and end days of a vacation plan from the calendar displayed on the screen. When the start and end days of a vacation plan are programmed on the calendar, the individual days shall be highlighted with the letter V displayed.

A provision shall be provided that will allow the operator to view only the highlighted days on the calendar that are programmed for a holiday plan, vacation plan or a day plan. A button shall be provided that will allow the operator to view all highlighted days simultaneously.

It shall be possible for day plans to be programmed during the days programmed for a vacation plan. This feature will allow the flashing beacons to operate during summer school or other school functions that may occur during the school vacation.

Over the Radio/Wi-Fi/LAN-Ethernet network, the holiday plan, day plan and vacation plan programs shall cause the software to automatically download the appropriate programming to all affected time switches.

The software shall automatically delete all holiday plans, day plans and vacation plans whose date has passed.

It shall be possible for the operator to copy all programming to include locations, day plans, holiday plans and vacation plans from one sub group to any of the other sub groups in the system.

It shall be possible for the operator to copy only the holiday and vacation plan programming from one sub group to any of the other sub groups in the system.

The software shall allow the operator to add and delete any holiday plan, day plan or vacation plan and to show all of the holiday plans, day plans and vacation plans on the computer screen. Print capability shall be provided for the holiday plans, day plans and vacation plans.

9.0 Display Today's Plan

The display today's plan screen shall show the month, day, year, all sub groups by name, day plan, vacation plan or override plan in effect for each sub group and the daily program. It shall be possible for the operator to view the daily program for any day in the future by selecting the month, day and year from a calendar displayed on the screen. It shall be possible for the operator to sort the daily program display by time of day and by sub group name. The operator shall have the capability of re-sending Week Plan and Vacation Plan commands.

Print capability shall be provided for any plan displayed on this screen.

10.0 Override Program

The main menu shall include a program override button that when clicked will allow the operator to create a special program and download that program to selected sub group/s or location/s of Radio/Wi-Fi/LAN-Ethernet programmable time switch/s in the field via the paging network. The Radio/Wi-Fi/LAN-Ethernet programmable time switch/s will run the override program until midnight of the same day and then revert to the program previously running. This feature will allow the agency to download a special program to account for daily operational changes due to inclement weather, special holidays, or other unforeseen events.

Over the Radio/Wi-Fi/LAN-Ethernet network, the system shall be capable of downloading an override program to

1) a single location within a sub group of time switches,
2) each individual sub group of time switches,
3) any number of selected sub groups of time switches, or
4) all sub groups of time switches.

Once the operator has sent an override command, the system shall provide a means for selecting any sub group running an override program, review that override program, and re-send or cancel the override command. When a Radio/Wi-Fi/LAN-Ethernet programmable time switch receives a cancel override command, it will revert to the program that was running prior to receiving the override command.

11.0 Manual Control

Over the Radio/Wi-Fi/LAN-Ethernet network, it shall be possible to manually control any set of location time switch/s, or an entire sub group of time switches, or all sub groups of time switches from the computer. The operator shall have the ability to build a manual control list of up to six sub group/location/ON or OFF commands. Once this manual control list is complete, the operator shall click a button to download all manual commands over the Radio/Wi-Fi/LAN-Ethernet network. In order for the operator to confirm that the manual command has been successfully transmitted, the manual control screen shall display all commands received by the time switch/es.

The time switches affected by this operation shall remain in the manual state until the next program step of the default, week plan or override plan, whichever is running.

12.0 Automatic and Manual Data Archive

At midnight each day the software shall determine if any changes were made to the program that day. If program changes were made, the software shall create an archive file to back up the data.

The software shall have an archive screen that shows a list of all of the previously archived files. A button shall be provided that will allow the operator to manually create an archive file to back up the data currently in the system. The operator shall be able to click on any previous archive file and load that program data into the system.

The name of each archive file shall include the month, day, year, hour, and minute that the archive file was made.

13.0 Locate all Time Switches

With the click of a button, the operator shall be able to initiate a search to locate all time switches in the field. Each time switch shall be displayed with its corresponding communication path as follows:

Radio network through the computer com port,
Radio network connected through a LAN (wireless or wired) network,
IP through a Wi-Fi network,
IP through a LAN (fiber optic or copper wire) network.

The system shall also display error/s that result from the search as follows:

When any time switches that are missing (radio and IP),
When more than one time switch have the same address (IP only),
When a time switch is located that is not included in the system database (IP only).

The system shall identify each location as a week or annual programmable time switch.

14.0 Time/Day Update and Week Plan Commands

With one Radio/Wi-Fi/LAN-Ethernet transmission, the software shall have the capability of downloading the current day-of-week and time-of-day to all time switches over the Radio/Wi-Fi/LAN-Ethernet network. This time/day update shall be initiated automatically and shall be broadcast 3 times at 2 minute intervals every Sunday. The operator shall set the hour and minute on Sunday morning to automatically broadcast the 3 time updates. Additionally, the operator shall have the option of manually transmitting the time/day update to all time switches at any time.

After the 3 time/day updates are sent on Sunday, the system will automatically download any alternate week plan programs to the time switch/s over the Radio/Wi-Fi/LAN-Ethernet network.

15.0 Validation of Time Switch Programming

To insure that each time switch is running the correct program, the software shall automatically poll each time switch for errors (see Error Detection). An error shall be

either 1) the Radio/Wi-Fi/LAN-Ethernet connection with the time switch failed or 2) the Radio/Wi-Fi/LAN-Ethernet connection passed but the program in the time switch did not match the program in the computer.

When errors are detected, the software will automatically retry to download the correct program and re-validate each time switch listed as having an error. The retry process will repeat every 30 minutes throughout Sunday in an effort to automatically clear all errors in all time switches.

16.0 Error Detection

The system software shall have the ability to detect errors with any Radio/Wi-Fi/LAN-Ethernet time switch in the field. The error shall be either 1) the Radio/Wi-Fi/LAN-Ethernet connection with the time switch failed or 2) the Radio/Wi-Fi/LAN-Ethernet connection passed but the program in the time switch did not match the program in the computer. An error button shall appear on the main menu of the software when one or more errors are detected. Clicking this button shall display a screen with all errors listed. Each error listed on this screen shall include the following information:

Type of Error Detected
Location Name and Number, Group Name and Number
Time, day and date the error was detected
Computer program for the location to include:
Default week plan, alternate week plan and override plan

From the error screen the operator shall have the ability to re-validate any error, reprogram any time switch listed, erase any individual error and erase all errors.

17.0 Error Notification System

If the software detects an error from any Radio/Wi-Fi/LAN-Ethernet time switch in the field, a coded signal shall be transmitted automatically over the radio network that will activate an Error Notification System. The error notification system shall be comprised of one or more locations with a radio time switch that is configured as an error notification unit. When the error notification system is activated, all of the error notification units shall energize their output relays to turn on a light. The purpose of the light is to alert all technicians that an error has been detected that requires attention.

When all errors have been cleared by the technician, the software shall automatically transmit a coded signal to deactivate the error notification system. The error notification system shall operate independent from All Group and/or All Location manual control commands to activate or deactivate the school beacons.

18.0 Log Files

The software shall create a log file for different functions. The log files are as follows:

Error Log – logs every error detected by the system.
Transmit Log – logs the data for every transmission from the computer.
System Log – log the time and date each time the software is launched and shut down.
Validate Log – logs the results each time the software tries to validate a time switch program.

These logs shall be easily assessable by the operator. The operator shall be able to select one or more log to be displayed on the screen. The operator shall be able to list the logs files recorded from any of the following time durations:

Last 24 Hours; Last 2 Days; Last 7 Days; Last 14 Days; Last 30 Days;
Last 3 Months; Last 6 Months; Last 9 Months

19.0 Validate Time Switch Programming

To insure that each time switch is running the correct program, the operator shall be able to manually activate a routine from a validate screen that will poll each time switch to validate the program. The validate screen shall list all time switches in the system by location name and number, and group name and number. When the validate process starts, the software will poll each time switch for errors (see Error Detection). An error shall be either 1) the Radio/Wi-Fi/LAN-Ethernet connection with the time switch failed or 2) the Radio/Wi-Fi/LAN-Ethernet connection passed but the program in the time switch did not match the program in the computer.

The validate screen shall allow the operator to disable any time switch from the validate process and to start and stop the validate process.

20.0 Exiting the Program

The operator shall have to execute at least three (3) buttons in order for the program to be shut down. At the last screen in this process, the computer shall display a distinct warning that the system will not operate if the program is exited. The operator shall have the option of completing the shut down procedure or returning to the program.

21.0 Password for Exiting the Program

The operator shall have the option of activating and deactivating a password feature. When activated, the password will be necessary to exit out of the program. The operator shall be able to change the password at any time.

22.0 Communications Set-up

The communications set-up of the software shall allow the operator to select the comm port for the radio transceiver from a pull down menu.

23.0 View Time Switch Program

The operator shall have the option of selecting any time switch from a list.

The operator shall have the ability to read the data from any time switch in the field. The software shall have a screen listing all of the Groups and Locations. The operator shall highlight any time switch Location and click to read the data programmed in that time switch. The data shall be as follows:

Actual day-of-week and time-of-day snapshot
Default week plan
Alternate week plan (if running)
Override plan (if running)
Actual status of relay (ON or OFF)

This data shall be purged from the computer each day at midnight.

This screen shall also display the program stored in the software for all Groups and Locations. The operator shall be able to show the computer program and the actual time switch program on the screen at the same time for comparison. The software shall indicate automatically if the program in the time switch does not match the program in the computer.

24.0 Set-up Time Switch

The system shall have the capability of programming any time switch (week or annual) over the Radio/Wi-Fi/LAN-Ethernet network. The setup time switch program will compile the commands necessary to program any week or annual time switch with the following:

Current day-of-week and time-of-day

Default week plan for the sub group selected

Alternate week plan currently running for sub group (if selected)

Special Week Plan to run the remainder of the week.

If a Special Week Plan is to be downloaded, the operator shall build this plan from the day plans programmed into the sub group selected.

The operator shall have the option of sending the setup program to the time switch over the Radio/Wi-Fi/LAN-Ethernet network or downloading the setup program directly to a time switch through a COM port on the computer. If downloading directly to a time switch, the operator shall select the computer COM port to be used for the download from a list of available COM ports.

25.0 Weekly or Annual Time Switch Programming

The system shall have the capability of uploading and downloading programming to week and annual time switches. The system may be comprised of all week time switches, all annual time switches or a combination of week and annual time switches. The software shall send the correct command regardless of whether the time switch is of week or annual design.

26.0 CRC Error Checking

To eliminate the possibility of a week time switch in the field receiving a corrupted transmission, the software shall include an algorithm that generates a four character, "Cyclic Redundancy Check" (CRC) error-checking character set. If a transmission contains programming for multiple week time switches, a unique CRC shall be generated for each week time switch program sent. The bidder will be required to demonstrate the CRC error checking capability to the agency as specified in the Test and Acceptance section of this specification. The Check Sum method of error checking shall not be accepted.

27.0 PDA Device Support (Palm OS and Windows Mobile)

The software shall create a database for Palm OS PDA's and Windows Mobile PDA's. The database for both devices shall include all programming available in the central computer.

28.0 Print Setup

The system shall have the capability of printing all programmed data. The operator shall be able to switch between a word format and a spreadsheet format for the printout.

29.0 Help Screens

The software shall include help screens that will assist the operator in the set-up and operation of the system software. A separate help button shall be displayed on each appropriate screen.

30.0 Warranty

The time switch programming device software and hardware, and the time switch units shall be warranted to be free from defects in material and workmanship for a period of

two years from the date of shipment. Any warranty service required shall be promptly performed at the manufacturer's facility or the manufacturer's authorized service agency. The purchaser will pay transportation costs to such service point, and the manufacturer will pay those costs to return the unit by normal surface transportation means.

Service information shall be available to the purchaser consisting of at least schematics, parts locators and parts lists.

31.0 Test and Acceptance

The apparent low bidder shall be required to supply a complete working system to the agency for testing and evaluation. This working system shall include a computer preloaded with the software, six field time switch units and any other equipment or supplies necessary for the agency to adequately test and evaluate the system.

The bidder shall set up the computer, the computer transceiver and the six field time switch units at a location identified by the agency. The bidder will successfully demonstrate the CRC error-checking feature to the agency personnel by simulating a weekly programmable time switch receiving normal commands and corrupted commands. The bidder will train agency personnel on how to program and operate the Radio/Wi-Fi/LAN-Ethernet programmable time switch system. The test and evaluation will take up to 60 days, at which time the equipment may be picked up by the bidder or shipped to the bidder freight collect.

Upon telephone or written notification, the bidder must deliver this equipment to the agency within 14 calendar days. Failure to comply with the above requirement will render the bid non-responsive.

MEASUREMENT AND PAYMENT:

CS-7: Master Radio, Central Office Computer and System Software - will be measured in units of each and paid for at the contract unit price per each. This price shall include furnishing and installing the central office computer and all associated miscellaneous cables, devices, and labor required for a complete installation.

CS- 8, FIELD SUPPORT, SET-UP AND TRAINING

1.0 FIELD SUPPORT

The CONTRACTOR shall provide qualified personnel on-site to assist with the installation, testing and initial operation of the school flasher equipment as needed. Included in this is the testing required to determine the exact location and placement of radio repeaters in coordination with the PROJECT ENGINEER as described in CS-9 "Engineering Support – Field Verification and Communication Design". This field support shall be provided at no cost to the CITY OF NEW ORLEANS DPW for travel, lodging, meals, telephone charges, or CONTRACTOR staff time.

2.0 TRAINING

The CONTRACTOR shall provide qualified instructors and all training material for training the CITY OF NEW ORLEANS DPW personnel in the operation and maintenance of system components. Training shall consist of classroom lectures as well as "hands-on" training. Training shall be provided at no direct cost by the CONTRACTOR.

The CONTRACTOR shall develop and submit training course outline to the PROJECT ENGINEER for approval within thirty (30) days of the Notice to Proceed for of the project.

The CONTRACTOR shall develop and supply all necessary manuals, displays, class notes, and visual aids, and/or other instructional materials as required to provide the training programs described herein. The system component manuals shall be individually bound in loose-leaf binders and at least three (3) copies shall be provided.

All training sessions shall be conducted at locations within New Orleans, Louisiana. The training location shall be provided by the CONTRACTOR and approved by the PROJECT ENGINEER. Dates and times of training shall be approved by the PROJECT ENGINEER.

The PROJECT ENGINEER in consultation with CITY OF NEW ORLEANS DPW and the CITY OF NEW ORLEANS DPW will determine the personnel who shall attend each training session.

Training sessions shall consist of a minimum of eight (8) hours for user orientation, operation, and maintenance of equipment.

The CONTRACTOR shall, as a minimum, establish training sessions for the following:

- Operational Overview
- Individual Flasher System and components
- Central Computer
- Communications
- System Software

3.0 COMPUTER AND PERIPHERAL HARDWARE

The CONTRACTOR shall furnish one (1) copy per microcomputer of hardware manuals detailing operation, routine maintenance requirements, troubleshooting procedures, interface drawings and parts lists for each piece of equipment furnished of any type or mode, including the computer and all peripherals. This shall include, but not be limited to the following:

- o Computer
- o Printer
- o Color monitor

4.0 MANUFACTURER SUPPLIED SOFTWARE

The CONTRACTOR shall submit three (3) copies of standard documentation for all manufacturer supplied software.

This documentation shall be submitted to the PROJECT ENGINEER no less than thirty (30) days prior to the start of the central microcomputer and peripheral equipment demonstration testing.

5.0 SOLAR FLASHER SYSTEMS USER'S MANUAL

The CONTRACTOR shall submit three (3) copies of the Solar Flasher System User's Manual for review and approval by the PROJECT ENGINEER upon delivery of the central computer on site.

6.0 ADDITIONAL ASSISTANCE

The CONTRACTOR shall provide additional assistance to the CITY OF NEW ORLEANS DPW as needed to ensure the successful implementation of the system. The service shall be provided at no cost to the CITY OF NEW ORLEANS DPW for travel, lodging, meals, telephone charges, or CONTRACTOR staff time.

The CONTRACTOR shall provide on-site assistance during this project.

The CONTRACTOR shall provide telephone assistance during the three (3) year warranty period.

The CONTRACTOR shall provide on-site assistance during the installation of equipment and the hookup of the proposed TMC.

MEASUREMENT AND PAYMENT:

CS-8: Field Support, Set-up and Training - will be measured as a lump sum and paid for at the lump sum contract price. This price shall include furnishing all materials listed and providing the manpower for all field support and training, as well as any incidentals required for this work.

CS- 9, ENGINEERING SUPPORT – COMMUNICATION DESIGN (REPEATER PLACEMENT) AND CS- 10, ENGINEERING SUPPORT- FIELD VERIFICATION

1.0 PROJECT ENGINEER

The CONTRACTOR shall provide a Professional Engineer to serve as the PROJECT ENGINEER. Duties will include all items described in these technical specifications. Additionally, the PROJECT ENGINEER will provide field verification when required and assist with the communication design.

2.0 COMMUNICATION DESIGN

The PROJECT ENGINEER in coordination with the CONTRACTOR and the system manufacturer will field test the radio repeaters and provide a communication design that includes the number of repeaters required.

3.0 FIELD VERIFICATION

The CONTRACTOR shall install the school flasher systems at the locations outlined in the Attachment A. However it is anticipated that during installation, exact locations for new installations will need to be field verified and that equipment designated as existing to remain may not be salvageable. In these cases, the CONTRACTOR is to contact the PROJECT ENGINEER to visit the site, examine the equipment and/or approve the proposed location. Exact locations of repeaters will also need to be verified in the field.

MEASUREMENT AND PAYMENT:

CS-9: Engineering Support – Communication Design - will be measured as a lump sum and paid for at the lump sum contract price. This price shall include all engineering time associated with providing PROJECT ENGINEERING services with the exception of field visits for verifying locations of flashers, examining existing equipment to remain or identifying exact locations for repeater placement.

CS-10: Engineering Support – Field Verification - will be measured as per hour and paid for at the contract price per hour. This price shall include mileage or other costs incurred as a result of the field visit to verifying locations of flashers, examining existing equipment to remain and identify repeater placement.

INVITATION TO BID
CITY OF NEW ORLEANS

BID PROPOSAL NO. 500C-00435
PROJECT NO. 2008-TRAF-01
SCHOOL FLASHING BEACON SYSTEM
REPAIR AND REPLACEMENT
CITYWIDE

ATTACHMENT "B"

CONTRACT TERMS AND CONDITIONS

1. EQUAL EMPLOYMENT OPPORTUNITY: In all hiring or employment made possible by, or resulting from this contract, there (1) will not be any discrimination against any employee or applicant for employment because of race, color, religion, gender, age, physical or mental disability, national origin, sexual orientation, creed, culture, or ancestry, and (2) where applicable, affirmative action will be taken to ensure that the Contractors employees are treated during employment without regard to their race, color, religion, gender, age, physical or mental disability, national origin, sexual orientation, creed, culture, or ancestry. This requirement shall apply to, but not be limited to the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation and selection for training, including apprenticeship. All solicitations or advertisements for employees shall state that all qualified applicants will receive consideration for employment without regard to race, color, religion, gender, age, physical or mental disability, national origin, sexual orientation, creed, culture, or ancestry.

2. ASSIGNABILITY: The Contractor shall not assign any interest in this agreement and shall not transfer any interest in the same without prior written consent of the City of New Orleans.

3. CONFLICT OF INTEREST: In the interest of ensuring that efforts of the Contractor do not conflict with the interests of the City, and in recognition of the Contractor's responsibility to the City, the Contractor agrees to decline any offer of employment if its independent work on behalf of the City is likely to be adversely affected by the acceptance of such employment. The initial determination of such a possibility rests with the Contractor. It is incumbent upon the Contractor to notify the City and provide full disclosure of the possible effects of such employment on the Contractor's independent work in behalf of the City. Final decision on any disputed offers of other employment for the Contractor shall rest with the City.

4. INDEMNIFICATION: The Contractor shall indemnify and save the City harmless against any and all claims, demands, suits, judgments of sums of money to any party accruing against the City for loss of life or injury or damage to persons or property growing out of,

resulting from, or by reason of any act or omission or the operation of the Contractor, its agents, servants or employees while engaged in or about or in connection with the discharge or performance of the services to be done or performed by the Contractor hereunder and shall also hold the City harmless from any and all claims and/or liens for labor, services, or materials furnished to the Contractor in connection with the performance of its obligation under this Agreement.

5. ACKNOWLEDGMENT OF EXCLUSION OF WORKER'S COMPENSATION COVERAGE: Contractor herein expressly agrees and acknowledges that it is an independent contractor as defined in R.S. 23:1021 (6) and as such, it is expressly agreed and understood between the parties hereto, in entering into this services agreement, that the City of New Orleans shall not be liable to the Contractor for any benefits or coverage as provided by the Workmen's Compensation Law of the State of Louisiana, and further, under the provisions of R.S. 23:1034 anyone employed by the Contractor shall not be considered an employee of the City for the purpose of Worker's Compensation coverage.

6. ACKNOWLEDGMENT OF EXCLUSION OF UNEMPLOYMENT COMPENSATION COVERAGE: Contractor herein expressly declares and acknowledges that it is an independent contractor, and as such is being hired by the City under this agreement for hire as noted and defined in R.S. 23:1472 (E), and therefore, it is expressly declared and understood between the parties hereto, in entering into this services agreement, or agreement for hire, and in connection with unemployment compensation only, that:

a. Contractor has been and will be free from any control or direction by the City over the performance of the services covered by this contract; and

b. Services to be performed by Contractor are outside the normal course and scope of the City's usual business; and

c. Contractor has been independently engaged in performing the services listed herein prior to the date of this agreement.

Consequently, neither Contractor nor anyone employed by Contractor shall be considered an employee of the City for the purpose of unemployment compensation coverage, the same being hereby expressly waived and excluded by the parties hereto.

7. WAIVER OF SICK AND ANNUAL LEAVE BENEFITS: It is expressly agreed and understood between the parties entering into this services agreement that the Contractor, acting as an independent agent, shall not receive any sick and annual leave benefits from the City of New Orleans.

8. JURISDICTION & CHOICE OF LAWS: The Contractor hereby consents and yields to the jurisdiction of the State Civil Courts of the Parish of Orleans, and does hereby formally waive any pleas of jurisdiction on account of the residence elsewhere of the Contractor. This Agreement shall be construed and enforced in accordance with the laws of the State of Louisiana, excepting its conflict of laws provisions.

9. DURATION: The services to be provided under the terms of this agreement shall begin upon execution of contract and shall end no later than twelve (12) months after. It is understood and acknowledged by all signers to this Agreement that work described under these terms is to be accomplished during the time period specified herein. The terms, conditions and duration of this agreement may be modified by an executed, written amendment to this Agreement.

10. EXTENSION: This agreement may be extended at the option of the City, provided that funds are allocated by the Council of the City of New Orleans and the extension of the agreement facilitates the continuity of services provided herein. This agreement may be extended by the City on an annual basis for no longer than five one year periods.

11. CANCELLATION: Either party to this contract may terminate the agreement at any time during the term of the agreement by giving the other party written notice of said intention to terminate at least (30) days before the date of termination.

12. SOLICITATION: The Contractor has not employed or retained any company or person, other than a bona fide employee working solely for him, to solicit or secure the subject contract. The Contractor has not paid or agreed to pay any person, other than a bona fide employee working for him, any fee, commission, percentage, gift, or any other consideration contingent upon or resulting from the subject contract.

INVITATION TO BID
CITY OF NEW ORLEANS

BID PROPOSAL NO. 500C-00435
PROJECT NO. 2008-TRAF-01
SCHOOL FLASHING BEACON SYSTEM
REPAIR AND REPLACEMENT
CITYWIDE

ATTACHMENT "C"
BID FORM

COMPLETE IN INK
Bidder Information:

Business Name: Jack B Harper Contractor, Inc **Business Tax ID No:** 72-1180277

Business Address: P.O. Box 309
Madisonville, LA 70470

Business Phone: 985-892-6500 **Business Fax No:** 985-892-0707

Business E-mail: chrisjackbharper@contractor.com

By: _____
Signature

Jerry S. Lawson, Jr.
Printed Name

Sr. Vice President
Printed Title

02/20/08
Date

By initialing below,	One (1)	Two (2)	Three (3)
Bidder acknowledges receipt of addenda issued	✓		

Bid is valid for NINETY DAYS after the bid deadline.
Attach evidence of the signing person's authority to enter the bid according to La. R. S. 38:2212.A.(1)(c).

ITEM NO.	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	UNIT PRICE CENTS	AMOUNT DOLLARS	AMOUNT CENTS
C202(52)(D)	63	REMOVAL AND DISPOSAL OF EXISTING SIDEWALK, DRIVEWAY FOOT LAP (CONCRETE, BRICK, ASPHALT, (ETC) AT sixty seven DOLLARS AND fifty CENTS PER SQUARE YARD	67	50	4,252 1	50
C202(55)	560	SAW CUT CONCRETE CURB, PAVEMENT, SIDEWALK DRIVEWAY ETC. ACCORDING TO PLANS (2"MIN. DEPTH) AT seven DOLLARS AND forty CENTS PER LINEAR FOOT	7	40	4,144 2	00
C706(51)(A)	63	CONCRETE SIDEWALK (4" THICK) AT Sixty five DOLLARS AND no CENTS PER SQUARE YARD	65	00	4,095 3	00
C706(52)(C)	21	CONCRETE DRIVEWAY (6" THICK) AT eighty DOLLARS AND no CENTS PER SQUARE YARD	80	00	1,680 4	00
C713(51)	L.S.	TEMPORARY SIGNS, BARRICADES, AND PAVEMENT MARKINGS AT Six thousand two hundred fifty DOLLARS AND no CENTS PER LUMP SUM	6250	00	6,250 5	00
C727(51)	L.C.	MOBILIZATION AT thirty nine thousand five hundred DOLLARS AND no CENTS PER LUMP SUM	39500	00	39,500 6	00
C729(51)	410	TRAFFIC SIGNS (STOP, YIELD, ONE WAY, SPEED LIMITS, ETC.) AT one hundred fifty DOLLARS AND no CENTS PER EACH	150	00	61,500 7	00

ITEM NUMBER	QUANTITY	ITEM DESCRIPTION	UNIT PRICE DOLLARS	UNIT PRICE CENTS	AMOUNT DOLLARS	AMOUNT CENTS
CS-1	31	CONCRETE FOUNDATION AT Seven hundred DOLLARS AND no CENTS PER EACH	700	00	21,700 8	00
CS-2	31	PEDESTAL POLE AT Seven hundred fifty DOLLARS AND no CENTS PER EACH	750	00	23,250 9	00
CS-3	31	REMOVAL OF EXISTING SCHOOL FLASHER EQUIPMENT AT Three hundred DOLLARS AND no CENTS PER EACH	300	00	9,300 10	00
CS-4	140	REMOVE AND REPLACE COMPACT SOLAR SCHOOL ZONE FLASHER AT four thousand nine hundred fifty DOLLARS AND no CENTS PER EACH	4,950	00	693,000 11	00
CS-5	205	TIME SWITCH WITH ANTENNA AT one thousand six hundred sixty two DOLLARS AND fifty CENTS PER EACH	1,662	50	340,812 12	50
CS-6	15	CPR RADIO REPEATER – SOLAR POWERED CABINET ASSEMBLY AT three thousand seven hundred fifty DOLLARS AND no CENTS PER EACH	3,750	00	56,250 13	00
CS-7	1	MASTER RADIO, CENTRAL OFFICE COMPUTER AND SYSTEM SOFTWARE AT twelve thousand nine hundred forty DOLLARS AND no CENTS PER EACH	12,940	00	12,940 14	00

ITEM NUMBER	QUANTITY	ITEM DESCRIPTION IN WORDS	UNIT PRICE DOLLARS	UNIT PRICE CENTS	AMOUNT DOLLARS	AMOUNT CENTS
CS-8	L.S.	FIELD SUPPORT, SETUP AND TRAINING AT Sixteen thousand five hundred DOLLARS AND no CENTS PER LUMP SUM	16,500	00	16,500 15	00
CS-9	L.S.	ENGINEERING SUPPORT-COMMUNICATION DESIGN (REPEATER PLACEMENT) AT twenty four thousand one hundred sixty five DOLLARS AND no CENTS PER LUMP SUM	24,125	00	24,125 16	00
CS-10	80	ENGINEERING SUPPORT – FIELD VERIFICATION AT One hundred seventy five DOLLARS AND no CENTS PER HOUR	175	00	14,000 17	00
CS-11	5 (qty.)	Hand-Held Display (per each) Six hundred fifty five dollars no cents	655	00	3,275	00

TOTAL BASE BID One million three hundred thirty three thousand five hundred seventy four & 00/100 —— **DOLLARS**

State of Louisiana

State Licensing Board for Contractors

This is to Certify that: JACK B. HARPER CONTRACTOR, INC.
P. O. Box 309
Mandeville, LA 704700309

2008

is duly licensed and entitled to practice the following classifications

ELECTRICAL WORK; STATEWIDE HIGHWAY, STREET AND BRIDGE CONSTRUCTION; SPECIALTY: CHEMICAL RESISTANT LININGS; SPECIALTY: ELECTRICAL SIGNS, SCOREBOARDS, DISPLAYS; BILLBOARD CONSTRUCTION; SPECIALTY: TELECOMMUNICATIONS; SPECIALTY: TRAFFIC SIGNAL INSTALLATION

STATE OF LOUISIANA · UNION JUSTICE CONFIDENCE ·

until December 31, 2008, when this certificate expires.
Witness our hand and seal of the Board dated,
Baton Rouge, La. 1st day of January 2008.

Charles D. Vaucresson
DIRECTOR

CHAIRMAN

No. 27043

This License Is Not Transferrable

SECRETARY-TREASURER

INVITATION TO BID
CITY OF NEW ORLEANS

BID PROPOSAL NO. 500C-00435
PROJECT NO. 2008-TRAF-01
SCHOOL FLASHING BEACON SYSTEM
REPAIR AND REPLACEMENT
CITYWIDE

ATTACHMENT "D"
Disadvantaged Business Enterprise (DBE) Program

The Bidder agrees to use its Best Efforts to fully comply with the DBE Program, including all reporting requirements and any specific contract goals for DBE participation.

Signature		Date 2/20/08
Printed Name and Title: JERRY LANIER, JR SR. VICE PRESIDENT		Company: JACK B. HARPER CONTRACTOR, INC

1. DBE Program Compliance. Contractor agrees to use its best efforts to fully and completely carry out the applicable requirements of the City's DBE Program in the award and administration of this Agreement, including, without limitation, all reporting requirements and specific DBE participation goals. Contractor's failure to carry out these requirements, as determined in good faith by the DBE Compliance Officer, shall be deemed a material breach of this Agreement, which may result in the termination of this Agreement or such other remedy as set forth in the City's Policy Memorandum for the DBE Program.

2. DBE Compliance Reporting. Contractor agrees to provide quarterly written reports to the DBE Compliance Officer on all expenditures made to achieve compliance with the DBE participation goals for this Agreement. The report shall, at a minimum, include the following:

    i. The name and business address of each DBE involved in the contract;
    ii. A description of the work performed and/or the product or service supplied by each DBE;
    iii. The date and amount of each expenditure made to a DBE; and
    iv. Such other information as may assist the DBE Compliance Officer in determining Contractor's compliance with the DBE Program and the status of any DBE performing any portion of the contract.

3. Access to Books and Records. Contractor agrees to grant DBE Compliance Officer reasonable access to its books and records for purposes of verifying compliance with the DBE Program.

INVITATION TO BID
CITY OF NEW ORLEANS

BID PROPOSAL NO. 500C-00435
PROJECT NO. 2008-TRAF-01
SCHOOL FLASHING BEACON SYSTEM
REPAIR AND REPLACEMENT
CITYWIDE

ATTACHMENT "E"

1. **School Zone Flashing List**
2. **City of New Orleans Public Assistance School Signs Map**

SCHOOL ZONE FLASHERS

ITEM	SCHOOL	ON_STREET	BLOCK_NO	FLOODED	PED DAM	GPS N	GPS W
1	ABRAMS	DWYER	6400	NO	NO	29.92187	-90.08835
1	ABRAMS	DWYER	6200	NO	NO	29.92035	-90.08757
2	ALLEN	NASHVILLE	1700	NO	NO	29.96859	-90.05499
2	ALLEN	NASHVILLE	2001	NO	NO	29.93595	-90.04153
3	AURORA	GEN. MEYER	5200	NO	NO	29.93276	-90.04152
3	AURORA	GEN. MEYER	5300	NO	NO	29.92461	-90.01879
4	BAUDIT	LOUISIANA	800	NO	NO	29.92469	-90.01594
4	BAUDIT	LOUISIANA	900	NO	NO	29.91750	-89.99276
5	BIENVILLE	FILMORE	1490	NO	NO	29.91832	-89.99282
5	BIENVILLE	FILMORE	1505	NO	NO	29.93823	-90.07131
6	BIENVILLE	MIRABEAU	1460	NO	NO	29.92919	-90.07665
6	BIENVILLE	MIRABEAU	1500	NO	NO	29.92689	-90.07433
7	CHESTER	BROAD	1200	NO	NO	29.92222	-90.11465
7	CHESTER	BROAD	1300	NO	NO	29.92438	-90.11420
8	CLAIBORNE	PRESS	4900	NO	NO	29.93255	-90.08309
8	CLAIBORNE	PRESS	4800	NO	NO	29.94498	-90.03672
9	COLTON	ST. CLAUDE	2250	NO	NO	29.94500	-90.03503
9	COLTON	ST. CLAUDE	2340	NO	NO	29.96769	-90.04377
10	CORPUS CHRISTI	ST. BERNARD	1900	NO	NO	29.96615	-90.03795
10	CORPUS CHRISTI	ST. BERNARD	2100	NO	NO	29.96586	-90.03565
11	CRAIG	CLAIBORNE	900	NO	NO	29.92040	-90.10991
11	CRAIG	CLAIBORNE	1013	NO	NO	29.92039	-90.11153
12	CRAIG	BASIN	1300	NO	NO	29.96628	-90.05999
12	CRAIG	BASIN	1500	NO	NO	29.96848	-90.05770
13	CROCKETT/LAFON	LOUISIANA	2500	NO	NO	29.93867	-90.02766
13	CROCKETT/LAFON	LOUISIANA	2700	NO	NO	29.93784	-90.02754
14	CROSSMAN	CARROLLTON	4300	NO	NO	30.01106	-90.00945
14	CROSSMAN	CARROLLTON	4500	NO	NO	29.92110	-90.09816
15	DEBORE	DWYER	13500	NO	NO	29.92087	-90.10084
15	DEBORE	DWYER	13700	NO	NO	29.92361	-90.10196
16	DEBORE	DWYER	13300	NO	NO	29.92130	-90.10136
16	DEBORE	DWYER	13500	NO	NO	29.93083	-90.07796
17	DEBORE	MICHOUD	5200	NO	NO	29.93244	-90.07922
17	DEBORE	MICHOUD	4900	NO	NO	29.94864	-90.04986
18	DERHAM	TOLEDANO	3900	NO	NO	29.94877	-90.04779
18	DERHAM	TOLEDANO	3600	NO	NO	29.93726	-90.07309
19	DIBERT	ORLEANS	4140	NO	NO	29.96491	-90.05634
19	DIBERT	ORLEANS	4300	NO	NO	29.96721	-90.05688
20	EDISON	CLAIBORNE	5100	NO	NO	29.94160	-90.05193
20	EDISON	CLAIBORNE	5200	NO	NO	29.94003	-90.05184
21	EDISON	ST. CLAUDE	6000	NO	NO	29.91991	-90.12239
21	EDISON	ST. CLAUDE	5200	NO	NO	29.92173	-90.12168
22	EDWARDS	HIGGINS	3100	NO	YES	29.93056	-89.99990
22	EDWARDS	HIGGINS	2800	NO	YES	29.92997	-89.99869
23	FISHER HENDERSON	L.B. LANDRY	1800	NO	YES	29.96871	-90.05277
23	FISHER HENDERSON	L.B. LANDRY	2100	NO	YES	29.92329	-90.00082
24	GANUS	PARIS	5900	NO	YES	29.92207	-89.99722
24	GANUS	PARIS	6100	NO	YES	29.93411	-90.08065
25	GAYARRE	CLAIBORNE	2600	NO	YES	29.96764	-90.04461
26	GAYARRE	ROBERTSON	2440	NO	YES	30.01181	-90.00506
27	GORDON	LEON C. SIMON	1700	YES	NO	30.02047	-90.01435
28	GORDON	ROBERT E. LEE	1600	YES	NO	29.93185	-90.11606
28	GORDON	ROBERT E. LEE	1700	YES	NO	29.93427	-90.11503
29	GREEN	FRERET	4500	YES	NO	30.01131	-90.07905
29	GREEN	FRERET	4700	YES	NO	30.01145	-90.07654
30	GREEN	VALENCE	2400	YES	NO	30.00722	-90.07774

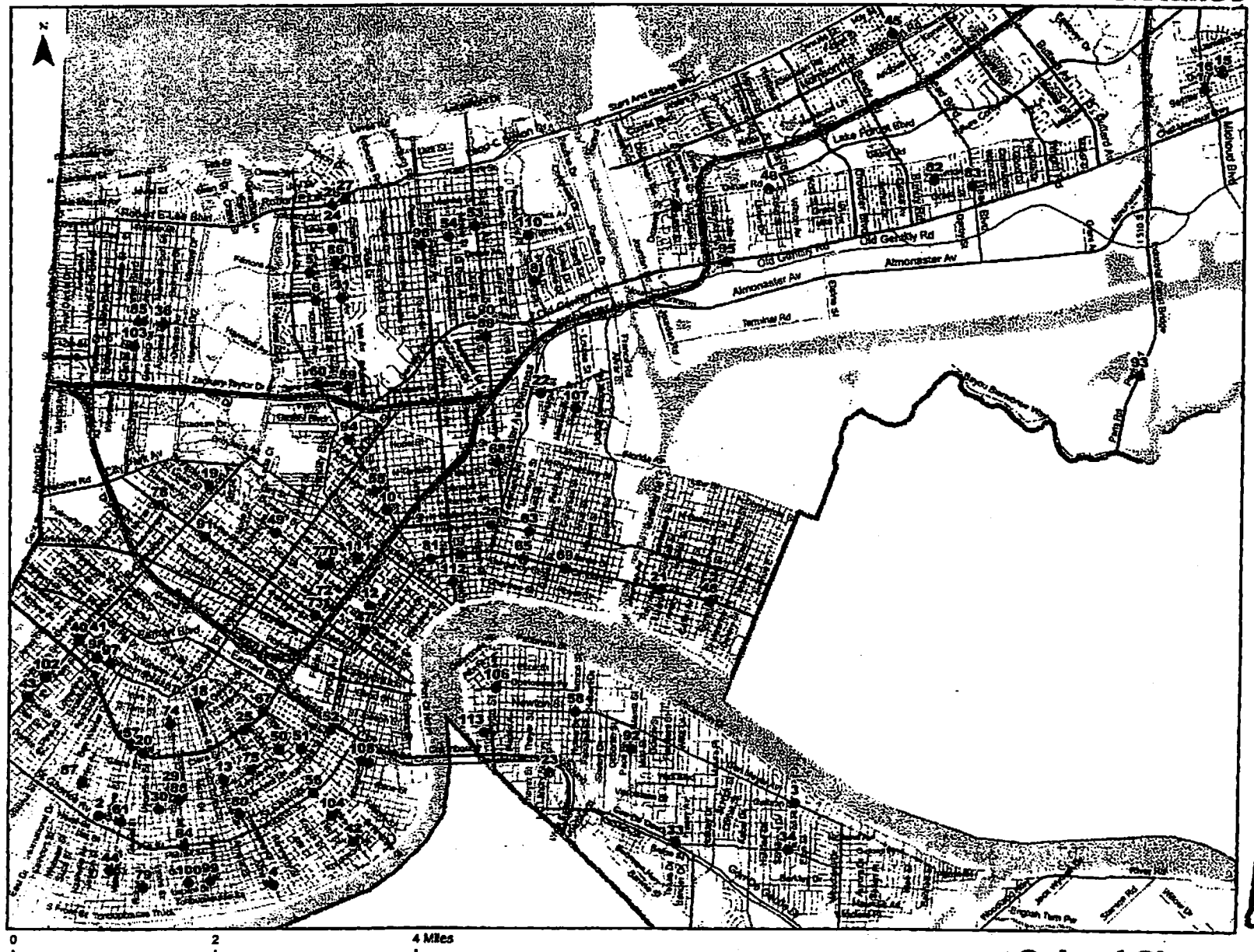
30	GREEN	VALENCE	2200	YES	NO	30.00717	-90.07669
31	GREGORY	MIRABEAU	1600	YES	NO	29.95294	-90.09769
31	GREGORY	MIRABEAU	1700	YES	NO	29.95390	-90.09707
33	HABANS	MACARTHUR	3600	YES	NO	30.01001	-90.04218
33	HABANS	MACARTHUR	3900	YES	NO	29.97613	-90.06761
34	HARTE	MACARTHUR	5100	YES	NO	29.97801	-90.06870
34	HARTE	MACARTHUR	5400	YES	NO	29.96697	-90.07120
35	HARTE	WOODLAND	1000	YES	NO	29.96589	-90.07142
35	HARTE	WOODLAND	900	YES	NO	29.96212	-90.07081
36	HYNES	HARRISON	900	YES	NO	29.96361	-90.07215
36	HYNES	HARRISON	990	YES	NO	29.93669	-90.09550
37	JACKSON	MAGAZINE	1300	YES	NO	29.97086	-90.10450
38	JONES	GALVEZ	1840	YES	NO	29.97246	-90.10286
39	JONES	MIRO	2000	YES	NO	30.03815	-89.92570
40	LAFAYETTE	CARROLLTON	2800	YES	NO	30.03723	-89.92854
40	LAFAYETTE	CARROLLTON	2600	YES	NO	30.03607	-89.92613
41	LAFAYETTE	WALMSLEY	7800	YES	NO	30.03938	-89.93030
42	LAUREL	JACKSON	1000	YES	NO	29.94802	-90.09933
42	LAUREL	JACKSON	700	YES	NO	29.95050	-90.10058
43	LEE	CARROLLTON	1500	YES	NO	29.98068	-90.09710
43	LEE	CARROLLTON	1700	YES	NO	29.98170	-90.09936
44	LEWIS	JEFFERSON	1100	YES	NO	29.96253	-90.02206
44	LEWIS	JEFFERSON	1200	YES	NO	29.96228	-90.01968
45	LITTLE WOODS	READ	7500	YES	NO	29.99374	-90.03597
45	LITTLE WOODS	READ	7700	YES	NO	29.99249	-90.04131
46	LIVINGSTON	DWYER	7500	YES	NO	30.01799	-90.07506
46	LIVINGSTON	DWYER	7200	YES	NO	29.97291	-90.05109
47	MCDONOGH 15	BASIN	300	YES	NO	29.93522	-90.10445
47	MCDONOGH 15	BASIN	400	YES	NO	29.93487	-90.10712
48	MCDONOGH 19	ST. CLAUDE	5800	YES	NO	29.93482	-90.10655
48	MCDONOGH 19	ST. CLAUDE	6000	YES	NO	29.93244	-90.10627
49	MCDONOGH 31	ORLEANS	3000	YES	NO	30.00748	-90.07333
49	MCDONOGH 31	ORLEANS	3200	YES	NO	30.00759	-90.07009
50	MCDONOGH 36	JACKSON	2500	YES	NO	30.00416	-90.10362
50	MCDONOGH 36	JACKSON	2300	YES	NO	30.00406	-90.10101
51	MCDONOGH 36	SIMON BOLIVAR	1800	YES	NO	29.97827	-90.06437
51	MCDONOGH 36	SIMON BOLIVAR	2100	YES	NO	29.97945	-90.06199
52	MCDONOGH 38	O.C. HALEY	1200	YES	NO	29.95957	-90.11686
52	MCDONOGH 38	O.C. HALEY	1400	YES	NO	29.95767	-90.11838
53	MCDONOGH 39	FRANKLIN	5700	YES	NO	29.95793	-90.11610
53	MCDONOGH 39	FRANKLIN	5800	YES	NO	29.94984	-90.12702
54	MCDONOGH 39	ST. ROCH	5600	YES	NO	29.95126	-90.12558
54	MCDONOGH 39	ST. ROCH	5900	YES	NO	30.04553	-89.98144
55	MCDONOGH 42	ST. BERNARD	2300	YES	NO	30.04662	-89.98248
55	MCDONOGH 42	ST. BERNARD	2200	YES	NO	30.02198	-90.00066
56	MCGEHEE	ST. CHARLES	2400	YES	NO	30.02166	-90.00405
56	MCGEHEE	ST. CHARLES	2200	YES	NO	29.95807	-90.07154
57	MCMAIN	CLAIBORNE	5800	YES	NO	29.96072	-90.01350
57	MCMAIN	CLAIBORNE	5500	YES	NO	29.96018	-90.01144
58	MEYER	GEN. MEYER	2000	YES	NO	29.97366	-90.08709
58	MEYER	GEN. MEYER	2100	YES	NO	29.97482	-90.08890
59	NELSON	PARIS	3600	YES	NO	29.94217	-90.08751
59	NELSON	PARIS	3800	YES	NO	29.94072	-90.08627
60	NELSON	ST. BERNARD	3700	YES	NO	29.94085	-90.08272
60	NELSON	ST. BERNARD	3900	YES	NO	29.93928	-90.08439
61	NEWMAN	JEFFERSON	1600	YES	NO	29.94286	-90.07785
61	NEWMAN	JEFFERSON	2000	YES	NO	30.01794	-90.05152
62	PALMER	CLAIBORNE	3100	YES	NO	30.01887	-90.05168
63	PALMER	ROBERTSON	3000	YES	NO	30.01638	-90.05592

65	PALMER	ST. CLAUDE	3100	YES	NO	29.97876	-90.06918
65	PALMER	ST. CLAUDE	3050	YES	NO	29.97997	-90.07006
66	ROGERS	MIRO	1200	YES	NO	29.94352	-90.11297
67	S.F. WILLIAMS	M.L. KING	3000	YES	NO	29.94233	-90.11063
67	S.F. WILLIAMS	M.L. KING	3200	YES	NO	29.99459	-90.07322
68	SHAW	FRANKLIN	2500	YES	NO	29.99670	-90.07373
68	SHAW	FRANKLIN	2400	YES	NO	29.99524	-90.07860
69	WASHINGTON	ST. CLAUDE	3700	YES	NO	29.93002	-90.11261
69	WASHINGTON	ST. CLAUDE	3900	YES	NO	29.97194	-90.04451
70	WHEATLEY	GALVEZ	800	YES	NO	29.97207	-90.07476
71	WHEATLEY	ORLEANS	2300	YES	NO	29.94768	-90.09083
71	WHEATLEY	ORLEANS	2400	YES	NO	29.94673	-90.08905
72	WICKER	BIENVILLE	1900	YES	NO	29.98368	-90.04893
72	WICKER	BIENVILLE	2105	YES	NO	29.98288	-90.04855
73	WICKER	CANAL ST.	1926	YES	NO	29.96801	-90.07699
73	WICKER	CANAL ST.	2000	YES	NO	29.96835	-90.07699
74	WILSON	NAPOLEON	3511	YES	NO	29.96864	-90.07980
74	WILSON	NAPOLEON	3700	YES	NO	29.96351	-90.08039
75	WOODSON	WASHINGTON	2400	YES	NO	29.96236	-90.07862
75	WOODSON	WASHINGTON	2500	YES	NO	29.96083	-90.08024
76	M. L. KING	CLAIBORNE	5500	YES	NO	29.96120	-90.08089
76	M. L. KING	CLAIBORNE	5700	YES	NO	29.94706	-90.10434
78	MARSHALL/ST ANTHONY	CANAL ST.	4500	YES	NO	29.94534	-90.10392
78	MARSHALL/ST ANTHONY	CANAL ST.	4700	YES	NO	29.93805	-90.09122
79	B.SACRAMENT/XAV PREP	MAGAZINE	5000	YES	NO	29.93979	-90.09256
79	B.SACRAMENT/XAV PREP	MAGAZINE	5200	YES	NO	29.96582	-90.01270
80	HOLY GHOST	LOUISIANA	1900	YES	NO	29.96601	-90.01443
80	HOLY GHOST	LOUISIANA	2100	YES	NO	29.97806	-90.10553
81	HOLY REDEEMER	ST. CLAUDE	1900	YES	NO	29.97898	-90.10743
81	HOLY REDEEMER	ST. CLAUDE	2100	YES	NO	29.93137	-90.09284
82	RESURRECTION	HAMMOND	9800	YES	NO	29.93338	-90.09390
82	RESURRECTION	HAMMOND	9600	YES	NO	30.02274	-89.97130
83	RESURRECTION	READ	4700	YES	NO	30.02248	-89.97394
83	RESURRECTION	READ	4800	YES	NO	30.02249	-89.96831
84	SACRED HEART	ST. CHARLES	4400	YES	NO	29.92668	-90.10244
84	SACRED HEART	ST. CHARLES	4600	YES	NO	29.92625	-90.10495
85	ST DOMINIC	HARRISON	700	YES	NO	30.00444	-90.10727
85	ST DOMINIC	HARRISON	800	YES	NO	30.00458	-90.10542
86	ST FRANCIS CABRINI	PARIS	5400	YES	NO	30.01286	-90.07469
86	ST FRANCIS CABRINI	PARIS	5700	YES	NO	30.01655	-90.07529
87	HOLY NAME OF JESUS	CALHOUN	2000	YES	NO	29.93700	-90.11850
88	OUR LADY OF LOURDES	NAPOLEON	2325	YES	NO	29.93570	-90.10301
88	OUR LADY OF LOURDES	NAPOLEON	2500	YES	NO	29.93386	-90.10281
89	ST JAMES	FRANKLIN	4200	YES	NO	30.00237	-90.05029
89	ST JAMES	FRANKLIN	4100	YES	NO	30.00122	-90.05004
90	ST JAMES MAJOR	GENTILLY	3700	YES	NO	30.00286	-90.04980
90	ST JAMES MAJOR	GENTILLY	3800	YES	NO	30.00308	-90.04720
91	ST JOHN	CANAL	3800	YES	NO	29.97311	-90.09809
91	ST JOHN	CANAL	4000	YES	NO	29.97426	-90.10021
92	ST JULIAN EYMARD	PACE	1500	YES	NO	29.98656	-90.07273
92	ST JULIAN EYMARD	PACE	1600	YES	NO	29.98834	-90.07297
93	ST LEO THE GREAT	PARIS	2819	YES	NO	29.98664	-90.07370
93	ST LEO THE GREAT	PARIS	3000	YES	NO	29.98913	-90.07512
94	ST LEO THE GREAT	ST. BERNARD	2900	YES	NO	30.01529	-90.06034
94	ST LEO THE GREAT	ST. BERNARD	3100	YES	NO	29.95580	-90.11438
95	ST PAUL THE APOSTLE	CHEF MENTUER	6730	YES	NO	29.95392	-90.11416
95	ST PAUL THE APOSTLE	CHEF MENTUER	7200	YES	NO	29.95500	-90.11594
96	ST RAPHAEL	ELYSIAN FIELDS	5500	YES	NO	29.95258	-90.12377
96	ST RAPHAEL	ELYSIAN FIELDS	5700	YES	NO	30.00132	-90.10838

97	ST RITA	BROAD PL.	7300	YES	NO	29.99336	-90.03472
98	ST RITA	FONTAINBLEAU	80	YES	NO	29.99045	-90.03536
98	ST STEPHEN	MAGAZINE	50	YES	NO	29.97641	-90.03468
99	ST STEPHEN	MAGAZINE	4100	YES	NO	29.97598	-90.03263
100	ST STEPHEN	NAPOLEON	4300	YES	NO	30.01655	-90.04245
101	CARROLLTON PRESBYTERE	NAPOLEON	1100	YES	NO	30.01729	-90.04232
102	ST PAUL EPISCOPAL	CARROLLTON	900	YES	NO	29.96830	-90.07199
103	TRINITY EPISCOPAL	CANAL BLVD.	1900	YES	NO	29.97169	-90.07703
104	TRINITY EPISCOPAL	JACKSON	6100	YES	YES	30.01962	-90.01743
104	HOLY NAME OF MARY	JACKSON	1200	YES	YES	30.00922	-90.04188
106	HOLY NAME OF MARY	OPELOUSAS	1400	YES	YES	29.93857	-90.09646
106	ST PHILIP	OPELOUSAS	600	YES	YES	30.03900	-89.92312
107	ST PHILIP	LOUISA	800	YES	YES	30.03597	-89.92973
107	JACKSON	LOUISA	3500	YES	YES	29.94134	-90.10807
108	FRANTZ	CAMP & COLISEUM	3200	YES	YES	29.94130	-90.10939
109	FRANTZ	GALVEZ	1300	YES	YES	30.02030	-90.07558
109	COGHILL	GALVEZ	3700	YES	YES	29.97405	-90.04805
110	COGHILL	PRESS	3900	YES	YES	30.02217	-90.07343
110	ROGERS	PRESS	5500	YES	YES	30.02112	-90.07513
111	ROGERS	URSULINES	5600	YES	YES	30.02140	-90.07202
111	ST. PETER & PAUL	URSULINES	1900	YES	YES	29.95916	-90.07080
112	ST. PETER & PAUL	ELYSIAN FIELDS	2400	YES	YES	29.94137	-90.07803
112	ALL SAINTS	ELYSIAN FIELDS	700	YES	YES	30.01963	-90.05633
113	ALL SAINTS	TECHE	900	YES	YES	29.99721	-90.07974
113	ST FRANCIS OF ASSISI	TECHE	1300	YES	YES	29.93285	-90.11181
114	ST FRANCIS OF ASSISI	STATE	1500	YES	YES	29.97250	-90.04178
114	ST RITA	STATE	500	YES	YES	30.02343	-89.96856
97	CARROLLTON PRESBYTERE	BROAD PL.	700	YES	YES	30.01729	-90.06097
102	ST PAUL EPISCOPAL	CARROLLTON	7200	YES	YES	29.95463	-90.11391
103		CANAL BLVD.	2100	YES	YES	29.95398	-90.12261
			6200	YES	YES	30.00362	-90.10810

CITY OF NEW ORLEANS

Public Assistance



CITY OF NEW ORLEANS
MAYOR'S OFFICE
OF
TECHNOLOGY

GIS DEPARTMENT
gis@cityofno.com

School Signs

CHOGIS \working\recommendedsigning\schoolsigns.mxd 11/16/2006

C. RAY NAGIN
MAYOR

CITY OF NEW ORLEANS
DEPARTMENT OF PUBLIC WORKS

1300 PERDIDO STREET - STE. 6W03 - NEW ORLEANS - LA 70112
(504) 658-8001 - FAX 658-8007

ROBERT MENDOZA
DIRECTOR

ADDENDUM NO. ONE (1)

February 6. 2008

Bid Proposal: 500C – 00435

Opening Date: February 20, 2008
at 2:00 p.m.

Subject: **SCHOOL FLASHING BEACON SYSTEM REPAIR AND REPLACEMENT**

TO: All PROSPECTIVE BIDDERS

Bids are to be submitted to the Bureau of Purchasing Office, Room 4W07, City Hall no later than Wednesday, February 20, 2008 by 2:00 p.m., scheduled bid opening time.

THIS ADDENDUM is to clarify **Contract and Terms (Attach B) by deleting** number 9 (DURATION) and number 10 (EXTENSION). The **Bid Specification (Attach A)** specifies the duration (Item E) Project Time: 120 calendar days after the insurance of the notice to proceed.

THIS ADDENDUM change the Bid Specification (Attach A) duration (Item E) Project Time: 180 calendar days after the insurance of the notice to proceed.

THIS ADDENDUM is also a Wage Compliance Contract. The latest Davis Bacon Compliance (general wage decision including modifications) is attached in accordance to the City Code Sections 70-416 and 70-417. This Code requires contractor working on City Public Works projects in excess of $25,000.00 to pay laborers and mechanics the prevailing wage as determined by the United States Department of Labor.

THIS ADDENDUM is also replacing **CS-4** with a new **CS-4 including additional information. Please see attachment.**

THIS ADDENDUM is also replacing **CS-5** with a new **CS-5 including additional information. Please see attachment**

THIS ADDENDUM is also adding **item CS – 11** to this project and the description and specifications are attached.

THIS ADDENDUM is also adding to **attachment "C" Bid Form**

CS – 11 5(qty) HAND-HELD DISPLAY (per each)

This addendum will be made part of the bid and contract documents. All bidders shall acknowledge receipt of this Addendum Number and Date in their bids.

Note: This addendum cover sheet with the contractor's authorized signature and all revised proposal letters must be attached to the proposal.

Robert Mendoza, Director

DPW

Bidders Authorized Signature

Date: 2/7/08

Cc: Andree Cohen, Bureau of Purchasing
Elmer Darwin, Principal Engineer, DPW
Allen Yrle, Project Manager, DPW
Donnye Brady, Contract Division, DPW
Bernice Early, Bureau of Purchasing

2008 FEB 20 P 12:26

First Class Mail

LA LICENSE 27043

Jack B. Harper
Contractor, Inc.
P. O. BOX 309 • MANDEVILLE, LOUISIANA 70470-0309

TO: City of New Orleans
Department of Finance
Purchasing Bureau, City Hall
1300 Perdido Street, Room 4W07
New Orleans, LA 70112

SEALED BID:
PROPOSAL # 500C-00435, School Flashing Beacon Sys
Bids: February 20, 2008 2 pm

RESOLUTION OF THE BOARD OF DIRECTORS OF

JACK B. HARPER CONTRACTOR, INC.

BE IT RESOLVED by the Board of Directors of **JACK B. HARPER CONTRACTOR, INC.**, a Corporation organized and existing under the laws of the State of Louisiana, and domiciled in the State of Louisiana, that Jerry S. Lawson, Jr., Vice President, Electrical Division, of the Corporation, be, and is hereby authorized to sign any and all contracts or documents and execute all papers and transact all business on behalf of said firm.

– CERTIFICATE –

I, Renee G. Cedotal, Secretary of **JACK B. HARPER CONTRACTOR, INC.**, do hereby certify that the foregoing resolution is a true and exact copy unanimously adopted by the Board of Directors of said Corporation at a meeting thereof legally held on the 5th day of December 2007; that said resolution is duly entered into the records of said Corporation; that it has not been rescinded or modified; and that it is now in full force and effect.

IN TESTIMONY WHEREOF, I have hereunto set my hand and the seal of said Corporation this 18th day of February, 2008.

Renee G. Cedotal
Secretary

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Liberty Mutual

Interchange Corporate Center
450 Plymouth Road, Suite 400
Plymouth Meeting, PA 19462-1644
Ph. (610) 832-8240

PERFORMANCE BOND

Bond Number: 16036924

KNOW ALL MEN BY THESE PRESENTS, that we Jack B. Harper Contractor, Inc.

, as principal (the "Principal"), and LIBERTY MUTUAL INSURANCE COMPANY, a Massachusetts stock insurance company, as surety (the "Surety"), are held and firmly bound unto City of New Orleans

, as obligee (the "Obligee"), in the penal sum of One Million Three Hundred Thirty Three Thousand Five Hundred Seventy Four Dollars and No Cents Dollars ($ 1,333,574.00), for the payment of which sum well and truly to be made, the Principal and the Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has by written agreement, dated the _____ day of _____, _____, entered into a contract (the "Contract") with the Obligee for School Flashing Beacon System Repair & Replacement Citywide

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal shall promptly and faithfully perform the Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

PROVIDED AND SUBJECT TO THE CONDITIONS PRECEDENT:

1. Whenever the Principal shall be, and declared by the Obligee to be in default under the Contract, the Obligee having performed the Obligee's obligations thereunder, the Surety may promptly remedy the default, or shall promptly:

   1.1 Arrange for the Principal, with consent of the Obligee, to perform and complete the Contract; or

   1.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

   1.3 Obtain a bid or bids from alternative contractors to complete the Contract in accordance with its terms and conditions, and upon determination by the Surety of the lowest responsible bidder, or if the Obligee elects, upon determination by the Obligee and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and the Obligee, and make available as work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding the amount set forth in the first paragraph of this bond. The term "balance of the contract price," as used in this paragraph, shall mean the total amount payable by the Obligee to the Principal under the Contract and any amendments thereto, less the amount properly paid by the Obligee to the Principal; or

   1.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

      a. After investigation, determine the amount for which it may be liable to the Obligee and, as soon as practicable after the amount is determined, tender payment therefore to the Obligee; or

      b. Deny liability in whole or in part and notify the Obligee citing reasons therefore.

2. Notwithstanding any other provision of this bond or the Contract, or otherwise, the Surety is not responsible for and shall not be held liable to the Obligee for any hazardous waste removal and the Surety shall not be held liable to, or in any other respect be responsible to, the Obligee by way of indemnity, claims or otherwise, or to any public authority or to any other person, firm or corporation, for or on account of any fines or claims by any public authority or for bodily injuries or property damage to any person or thing, including, but not limited to, injury or damage due to the release or threat of release of hazardous substances of any kind or damage to real estate or to the environment or clean-up costs or other damages of whatever kind or nature arising out of any act of commission or omission by the Principal, the Principal's agents, servants, employees, subcontractors or suppliers or any other person in connection with the performance of the Contract. This limitation applies regardless of when any such fine is assessed, claim is made, or injury, damage, release or threat of release occurs and without regard to any term or condition of the Contract.

3. The Surety hereby waives notice of any alteration or extension of time made by the Obligee.

4. Any suit under this bond must be instituted before the expiration of one (1) year from the date on which the Principal ceased to work on the Contract or such time period as otherwise permitted by relevant statute. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

5. No right of action shall accrue on this bond to or for the use of any person or corporation other than the Obligee named herein or the heirs, executors, administrators or successors of the Obligee.

6. Any claims must be presented in writing to Liberty Mutual Insurance Company to the attention of the Surety Law Department at the above address.

DATED as of this_____ day of_____, _____.

WITNESS / ATTEST

Jack B. Harper Contractor, Inc.
(Principal)

By: _____ (Seal)

Name: QUIN J. BOYLAN
Title: PRESIDENT

LIBERTY MUTUAL INSURANCE COMPANY
(Surety)

By: _____ (Seal)
Attorney-In-Fact

Kathleen L. Berni