ARTICLE 2: SPECIAL PROVISIONS (SP)

SP-01, MOBILIZATION

1. **DESCRIPTION**

This work consists of preparatory work and operations to mobilize personnel, materials and equipment to the project site.

Mobilization shall consist of obtaining all required insurance, bonds and permits; preparatory work and operations necessary for the movement of personnel, equipment, supplies, and incidentals to the project site; preparation of a construction schedule; training of flaggers and other employees as required; and all other work which must be performed or cost incurred prior to beginning work on the various contract items at the specified project site.

STANDARD‐ Standard mobilization as agreed upon by the Contractor and the Engineer will be dependent on the urgency of the work needed. The mobilization may occur between 24 hours and 2 weeks.

1. **MEASUREMENT AND PAYMENT**

Mobilization will be paid as a unit price for each location. Project location(s) will be defined as the exact location of each RRFB installation.

**Payment will be made under:**

**Mobilization Each Location**

SP-02, SOLAR POWERED RECTANGULAR RAPID FLASHING BEACONS (RRFB)

1. **GENERAL**

The work covered by this special provision includes furnishing and installing Rectangular Rapid Flashing Beacons (RRFB) in accordance with the current edition of the North Carolina Department of Transportation (NCDOT) Traffic Signal Specifications, CDOT requirements, and the provisions of these specifications.

RRFB assemblies must be attached to a W11‐2 (Pedestrian) crossing warning sign with a diagonal downward arrow (W16‐7p) plaque, a pedestal pole with base (SP‐04), and attachment hardware with pushbuttons in the median stop and on each side of the roadway. On multi‐lane approaches, RRFB assemblies shall be dual indicated.

Equipment must operate on solar power. Solar powered systems must automatically charge batteries and prevent overcharging and over‐discharging. Solar powered systems must include a charge indicator and AC/DC battery charger.

1. **MATERIALS**
   1. Light Bar Housing and Indications
      1. The Light Bar housing shall be constructed of durable, corrosion resistant powder-coated aluminum with stainless steel fasteners.
      2. Enclosed components shall be modular in design whereby any component can be easily replaced using common hand tools, without having to remove the housing from the pole.
      3. All mounting hardware required for mounting the Light Bar housing shall be provided and shall be stainless steel.
      4. Each of the two vehicle RRFB LED indications shall be approximately 7.25” wide x 3” high.
      5. A pedestrian LED indication, approximately 0.5” wide x 2.5” high, shall be side-mounted in the Light Bar housing to be directed at and visible to pedestrians in the crosswalk.
      6. The LEDs used shall be rated for a minimum 15-year life span.
   2. Controller
      1. The Controller shall be housed in a NEMA 3R rated aluminum enclosure, intended for indoor or outdoor use, primarily to provide a degree of protection against corrosion, windblown dust, and rain, splashing water, hose‐directed water, and damage from ice formation.
      2. The LED light outputs and flash pattern shall be completely programmable.
      3. The flashing output shall have 70 to 80 periods of flashing per minute, during which one of the yellow indications shall emit two medium pulses of light and the other yellow indication shall be maintained as programmed for the duration of the pulse. The flashing output shall be programmable.
      4. The Controller shall be reconfigurable if future MUTCD or State guidelines specify a different flash pattern.
      5. The Controller shall be, in the unlikely event of failure, replaceable independently of other components.
   3. Battery
      1. The Battery shall be a 12VDC Absorbed Glass Mat (AGM) sealed lead-acid, maintenance-free battery.
      2. The Battery shall be rated 45AH minimum and shall conform to Battery Council International (BCI) specifications.
      3. The Battery shall be solar charged with a capacity of 30 days of autonomy without sunlight, varying with ambient temperature and number of activations.
      4. The Battery shall be replaceable independently of other components.
      5. The Battery shall have a minimum operating temperature range of -76o to 140oF (-60o to 60oC).
   4. Wireless Transceiver Radio
      1. Radio control shall be solar powered, operating on a FCC approved 900mhz frequency, hopping spread spectrum network with a normal operating range of 1000 feet.
      2. Radios shall provide wireless communication between the Assemblies to integrate the pushbutton activation of indications.
      3. To ensure all integral indications consistently flash in unison, the Radio shall synchronize the Controllers to activate the indications within 120msec of one other and remain synchronized throughout the duration of the flashing cycle.
      4. Radio systems shall operate from 3.6 VDC to 15 VDC.
      5. The Radio shall be, in the likely event of failure, replaceable independently of other components.
      6. The Radio shall have a minimum operating temperature of -30oF to 165oF (-34.4o to 73.8oC).
   5. Solar Panel
      1. The Solar Panel shall provide 55 watts at peak total output.
      2. The Solar Panel shall be affixed to an aluminum plate and bracket, adjustable at an angle of 45o ‐ 60o to facilitate adjustment for maximum solar collection and optimal battery strength.
   6. **EXECUTION**
      1. The light intensity of the vehicle indications shall meet the minimum specifications of Society of Automotive Engineers (SAE) standard J595 (Directional Flashing Optical Warning Devices for Authorized Emergency, Maintenance, and Service Vehicles) dated November 2008. Manufacturer Certification of Compliance shall be provided upon request.
      2. When activated, all indications associated with a given crosswalk (including those with an advance crossing sign, if used) shall simultaneously commence operation of their alternating rapid flashing within 120msec and shall cease operation at a predetermined time after the pedestrian actuation.
      3. The Pedestrian indication shall be directed at and visible to pedestrians in the crosswalk, and it shall flash

concurrently with the vehicle indications to give confirmation that the RRFB is in operation.

* + 1. Autonomy with a fully charged battery shall be up to 14‐28 days without sun, dependent upon ambient temperature and number of activations.
    2. Restore any areas impacted by the installation of the crosswalk enhancement assembly to original condition unless otherwise shown in the Plans. Install crosswalk enhancement assembly in accordance with the Americans with Disabilities Act Standards for Transportation Facilities.
    3. Ensure the midblock crosswalk enhancement assembly has a manufacturer’s warranty covering defects for two years from the date of final acceptance. Ensure the warranty includes providing replacements within 10 calendar days of notification for defective parts and equipment during the warranty period at no cost to the Department or the maintaining agency.
  1. **MEASUREMENT AND PAYMENT**
     1. RRFBs are intended to operate in pairs. The quantity of RRFBs to be paid for will be the actual number of RRFBs which have been furnished, installed, and accepted, measured on a per PAIR basis.
     2. The quantity of RRFBs, measured as provided above, will be paid for at the contract unit price per PAIR. Such payment will be full compensation for all work covered by this special provision, including but not limited to all excavation, furnishing, and installing the RRFB.

Payment will be made under:

**SOLAR POWERED RECTANGULAR RAPID FLASHING BEACONS PAIR**

SP – 03, AC POWERED RETANGULAR RAPID FLASHING BEACONS (RRFB)

1. **GENERAL**

The work covered by this special provision includes furnishing and installing Rectangular Rapid Flashing Beacons (RRFB) in accordance with the current edition of the North Carolina Department of Transportation (NCDOT) Traffic Signal Specifications, CDOT requirements, and the provisions of these specifications.

RRFB assemblies must be attached to a W11‐2 (Pedestrian) crossing warning sign with a diagonal downward arrow (W16‐7p) plaque, a pedestal pole with base (SP‐04), and attachment hardware with pushbuttons in the median stop and on each side of the roadway. On multi‐lane approaches, RRFB assemblies shall be dual indicated.

Equipment must operate on AC power.

1. **MATERIALS**
   1. Light Bar Housing and Indications
      1. The Light Bar housing shall be constructed of durable, corrosion resistant powder-coated aluminum with stainless steel fasteners.
      2. Enclosed components shall be modular in design whereby any component can be easily replaced using common hand tools, without having to remove the housing from the pole.
      3. All mounting hardware required for mounting the Light Bar housing shall be provided and shall be stainless steel.
      4. Each of the two vehicle RRFB LED indications shall be approximately 7.25” wide x 3”high.
      5. A pedestrian LED indication, approximately 0.5” wide x 2.5” high, shall be side-mounted in the Light Bar housing to be directed at and visible to pedestrians in the crosswalk.
      6. The LEDs used shall be rated a minimum 15-year life span.
   2. Controller
      1. The Controller shall be housed in NEMA 3R rated aluminum enclosure, intended for indoor or outdoor use, primarily to provide a degree of protection against corrosion, windblown dust, and rain, splashing water, hose-directed water, and damage from ice formation.
      2. The LED light outputs and flash pattern shall be completely programmable
      3. The flashing output shall emit two medium pulses of light and the other yellow indication shall emit four short rapid pulses of light followed by a long pulse. The output current shall be maintained as programmed for the duration of the pulse. The flashing output shall be programmable.
      4. The Controller shall be reconfigurable if future MUTCD or State guidelines specify a different flash pattern. 5.

6. The Controller shall be, in the unlikely event of failure, replaceable independently of other components.

* 1. Power
     1. The RRFB will be powered by 120 volts alternating current.
     2. A meter pedestal shall be provided per SP-05.New services should be mounted on a pedestal extension and not on a wood post unless approved prior by the Engineer.

For the purpose of this contract, it shall be assumed that it will take up to 3 days for a State Electrical Inspector to arrive on site to inspect a new service, and 7 days for a power company to install a new electrical service.

Additional days will NOT be granted if these time periods are shorter.

* 1. Wireless Transceiver Radio
     1. Radio control shall be AC powered, operating on a FCC approved 900mhz frequency, hopping several spectrum network with a normal operating range of 1000 feet.
     2. Radios shall provide wireless communication between the Assemblies to integrate the pushbutton activation of indications.
     3. To ensure all integral indications consistently flash in unison, the Radio shall synchronize the Controllers to activate the indications within 120 msec of one other and remain synchronized throughout the duration of the flashing cycle.
     4. Radio systems shall operate from 3.6 VDC to 15 VDC.
     5. The Radio shall be, in the unlikely event of failure, replaceable independently of other components.
     6. The Radio shall have a minimum operating temperature range of -30oF to 165oF (-34.4o to 73.8oC).

**3.0 EXECUTION**

1. The light intensity of the vehicle indications shall meet the minimum specifications of Society Automotive Engineers (SAE) standard J595 (directional Flashing Optical Warning Deceives for Authorized Emergency, Maintenance, and Service Vehicles) Dated November 2008. Manufacturer Certification of Compliance shall be provided upon request.
2. When activated, all indications associated with given crosswalk (including those with an advance crossing sign, if used) shall simultaneously commence operation of their alternating rapid flashing within 20msec and shall cease operation at a predetermined time after the pedestrian actuation.
3. The Pedestrian indication shall be directed at and visible to pedestrians in the crosswalk, and it shall flash concurrently with the vehicle indications to give confirmation that the RRFB is in operation.
4. Restore any areas impacted by the installation of the crosswalk enhancement assembly to original condition unless otherwise shown in the Plans. Install crosswalk enhancement assembly in accordance with the Americans with Disabilities Act Standard for Transportation Facilities.
5. Ensure the midblock crosswalk enhancement assembly has a manufacturer’s warranty covering defects for two years from the date of final acceptance. Ensure the warranty includes providing replacements within 10 calendar days of notification for defective parts and equipment during the warranty period at no cost to the Department or the maintaining agency.
   1. **MEASUREMENT AND PAYMENT**
      1. RRFBs are intended to operate in pairs. The quantity of RRFBs to be paid for will be the actual number of RRFBs which have been furnished, installed, and accepted, measured on a per PAIR basis.
      2. The quantity of RRFBs, measured as provided above, will be paid for at the contract unit price per PAIR. Such payment will be full compensation for all work covered by this special provision, including but not limited to all excavation, furnishing, and installing the RRFB.

Payment will be made under:

**AC POWERED RECTANGULAR RAPID FLASHING BEACONS PAIR**

SP‐04 RRFB PEDESTALS AND BASES

1. **DESCRIPTION**

The Contractor shall supply concrete, anchor bolts and forms necessary for constructing proposed or relocated pedestal bases. The Contractor shall supply all material necessary to install a complete pedestal

assembly. Pedestals shall be installed in conformance with drawing 1743.04‐2‐CDOT (See section 00 75 00, Article 4), modified for RRFB application rather than pedestrian signals. The Contractor shall build concrete foundations in accordance with NCDOT approved pedestal 1743.04 Type III. The foundation shall be 7 feet in depth.

The contractor shall supply and install 15‐ft aluminum Type II pedestals with square bellhousing and cap as specified in the plans.

1. **MEASUREMENT**

Pedestal Bases and Foundations will be measured and paid as the actual number of each type listed below furnished, installed, and accepted.

***“NOTE: The combination requested is an NCDOT Type II compatible pedestal with a 7” deep foundation capable of accommodating a Type II pedestal. This is the intended installation.”***

15FT. METAL BASE/POLE/CAP TYPE II PEDESTAL

7’ TYPE III CONCRETE FOUNDATION FOR PEDESTAL

1. **PAYMENT**

Payment will be made under:

**SUPPLY/INSTALL 15FT. METAL BASE/POLE/CAP TYPE II PEDESTAL EA**

**7’ TYPE III CONCRETE FOUNDATION FOR PEDESTAL EA**

SP‐05 COMBINATION METER PEDESTAL AND GROUNDING GRID

**1.0 DESCRIPTION**

The work in this special provision consists of all labor and material necessary to install one (1) electrical meter service and disconnect combination panel as a standalone pedestal with grounding grid. This shall be in accordance with drawing 1751.01‐5‐CDOT, applied to the RRFB cabinet rather than a traffic signal cabinet. This item includes all material necessary to install an electrical service including, combination panel, conduits, disconnect, wire, breakers, attachment structure, grounding hardware and all other incidentals. New services should be mounted on a pedestal unless approved prior by the Engineer. This unit also includes all labor and material required in the repair and/or replacement of streets, sidewalks, roads, drives, fences, lawns, shrubbery, water mains, pipes, pipelines and contents, underground power, and telecommunications facilities, buried sewage and drainage facilities, and any other property damaged during the unit installation.

Combination pedestals shall:

1. Be no larger than 60” (H) x 14” (W) x 12” (D), installed (subtract total height from embedment for direct

bury)

1. Be listed on Duke Energy’s Meter Equipment Group approved list or have written approval for use from Duke

Energy’s Meter Engineering division.

1. Be capable of pad‐mount or direct bury installation as applicable.
2. Have no externally visible conduits.
3. Feature a bypass lever in the meter socket.
4. Feature a factory‐installed fifth terminal in the meter socket.
5. Feature breakers and breaker knockouts only, no receptacles.

Install a minimum of three grounding rods in accordance with NCDOT Standard Drawing 1700.02 ensuring existing underground facilities are not damaged and test grounding system with approved method ensuring resistance is less than 20 Ohms. All underground bond of grounding electrodes and conductors shall be made using irreversible compression ground connectors. Unless the irreversible compression connectors are designed for use with more than one conductor, only one conductor shall be placed under each irreversible compression ground connector. Ensure all connections are made using a hydraulic, power or ratcheting type crimper with appropriate dies. Use of handheld pliers for crimping is prohibited. For ease of inspection, the top of ground rods shall be no more than 6 inches below finished grade and shall remain exposed until electrical inspection is complete. Detectable burial tape shall be placed directly above all grounding electrodes and conductors and shall be buried at a typical depth of

12”‐18. Locate the service equipment near the signal cabinet in a manner that will allow easy access to the service

disconnect and does not obstruct motorist sight distance.

For overhead electrical service installations, supply & install wire (3 conductor, 8AWG) between the meter

pedestal and point‐of‐service under this special provision. Conduit and riser from meter pedestal to pole are separate pay items.

1. **MEASUREMENT**

Installed Combination Meter Pedestal and Grounding Grid will be measured and paid as the actual number of pedestals installed and accepted.

1. **PAYMENT**

Payment will be made under:

COMBINATION METER PEDESTAL AND GROUNDING GRID EA

SP-06 RISER ASSEMBLIES (1722 MODIFIED)

1. **DESCRIPTION**

Furnish and install riser assemblies with Sch. 80 PVC conduit, Sch. 80 PVC weatherheads, galvanized pole attachment fittings and all necessary hardware.

1. **MATERIAL**

Materials are as set out in **NCDOT Standard Specification 1722** with the addition of:

Use only Schedule 80 PVC conduit and weatherheads unless otherwise approved by the Engineer.

1. **CONSTRUCTION METHODS**

Construction methods are as set out in **NCDOT Standard Specification 1722.**

1. **MEASUREMENT AND PAYMENT**

Measurement and payment are as set out in **NCDOT Standard Specification 1722.**

RISER ASSEMBLY (2” SCH.80 PVC) EA

SP – 07, INSTALL APS PEDESTRIAN PUSHBUTTON DETECTOR & SIGNS (CITY SUPPLIED)

1. **DESCRIPTION**

This item includes the labor **(ONLY) and any necessary hardware** to install APS Pedestrian Pushbutton Detectors & Signs as supplied by the City. Installation should be in compliance to Section 1705‐3 (C) of the NCDOT Standard Specifications.

1. **MEASUREMENT**

APS Pedestrian Pushbutton Detectors & Signs will be measured and paid as the actual number of APS Detectors & Signs installed and accepted. A Sign and corresponding detector shall be considered one unit.

1. **PAYMENT**

**Payment will be made under:**

**INSTALL APS PEDESTRIAN PUSHBUTTON DETECTOR & SIGNS (CITY SUPPLIED) EA**

SP – 08, TRAFFIC CONTROL

1. **DESCRIPTION**

Protection for Construction Staking: The Contractor is responsible for providing, placing, maintaining and removing upon completion, all traffic control devices necessary for the protection of survey crews performing construction staking requested by the Contractor for construction of this project when any offset, reference points, benchmark

or any other control point is within the travel lane of any roadway, drive, parking lot or other area where vehicles could endanger or obstruct the survey crew.

Beginning Work and Street Closings: The Contractor is responsible for notifying the Implementation Section Manager of the Charlotte Department of Transportation (CDOT), or their designee at 704-336-4119 in accordance with Sections “Approval and Notification Requirements for Work in the Public Right-Of-Way” and “Notifications for complete Roadway Closure” of the Work Area Traffic Control Handbook (WATCH) of any work where the number of travel lanes is reduced from normal conditions.

The Contractor shall install advance warning signs for the Project. These signs shall be in place for 7 calendar days before construction activity begins. The Contractor shall begin construction activity on a street on the scheduled date for the closing of the travel lane.

During daily construction work hours, the Contractor will maintain at least one lane of traffic. During periods of construction inactivity, all lanes of traffic will be open unless otherwise shown on the plans or noted in the specifications.

Right-of-Way Use Permit: The Contractor will not be responsible for obtaining the Right-of-Way Use Permit(s) from CDOT for approval to work in the streets rights-of-way in Charlotte. The permit(s) will be obtained by the City’s Engineering and Property Management department.

Traffic Control Plan: Traffic control will be performed by the Contractor based upon the Traffic Control Special Provisions. The Traffic Control Special Provisions may refer to plan sheets for major work items or details in the WATCH, or both.

The Contractor shall be thoroughly familiar with the current edition of the WATCH. All traffic control devices and procedures shall conform to the requirements of the WATCH, the current edition of the Federal Highway Administration (FHWA) *Manual on Uniform Traffic Control Devices* (MUTCD), the current edition of the North Carolina Department of Transportation (NCDOT) Supplement to the *Manual on Uniform Traffic Control Devices for Streets and Highways*, the NCDOT Roadway Standard Drawings and the current edition of the NCDOT Standard Specifications for Roads and Structures.

Under no circumstances shall the WATCH requirements be less restrictive than what is required by the MUTCD or NCDOT Supplement to the MUTCD. Any requirements prescribed by the MUTCD or amendments by the NCDOT Supplement to the MUTCD will supersede the requirements of the WATCH should conflict arise.

The Contractor shall maintain the traffic control as described herein unless the Contractor submits an alternate traffic control plan to the Engineer and it is approved by the Engineer. The Engineer may direct the Contractor to modify the traffic control if, in the Engineer’s opinion, traffic is not moving safely or efficiently.

Traffic Control Phasing for this project shall be in accordance with the Traffic Control Plans and the reference diagrams from the WATCH. The contractor shall adhere rigidly to these plans and diagrams. If these diagrams are not typical for field conditions, the diagrams may be combined or altered upon approval of the Engineer. The standards and diagrams are the minimum required. Additional signs, cones, drums, barricades, and warning devices may be used, but at no time will less than what is specified on the plans, in the standards, and on diagrams be acceptable.

Maintenance of Traffic: The Contractor shall maintain all travel lanes in accordance with the Traffic Control Plan sheets, and the WATCH diagrams referenced in the Traffic Control Phasing.

Construction or maintenance work that involves closure of a lane of traffic will not be allowed during the peak flow hours as described in Section “Peak Flow Hours” of the WATCH, unless otherwise specified in the Contract Documents.

The Contractor shall use flagger control in accordance with the WATCH diagrams referenced in the Traffic Control Phasing and with Sections “Flagging Procedures”, “Duration of Work”, and Temporary Traffic Control Zone Devices” of the WATCH.

In areas of drop-offs and low shoulders, the Contractor shall backfill up to the edge and elevation of the existing pavement in accordance with Section “Miscellaneous Considerations, DROP-OFFS AND LOW SHOULDERS” of the WATCH.

The Contractor will be required to maintain ingress and egress to all businesses and dwellings, and easy access to fire hydrants in accordance with Section “Miscellaneous Considerations, INGRESS AND EGRESS” of the WATCH.

The Contractor shall not work on both sides of the road simultaneously within the same area.

The Contractor shall provide adequate drainage under driveways and within the Project area for the duration of the Project.

The Contractor shall mark all hazards within the Project limits with well-maintained signs, barricades, warning and/or channelizing devices.

Traffic Control Devices: The Contractor shall furnish, install, operate, relocate, maintain, and remove all temporary traffic control devices necessary for controlling traffic in accordance with the WATCH. The Contractor shall notify CDOT regarding conflicting permanent signs. Only CDOT forces shall install, remove, or relocate any permanent signs within the right-of-way. All construction signs and barricades shall remain in place until the appropriate permanent signs and pavement markings are installed.

Pedestrian Considerations: The Contractor shall accommodate the needs of all pedestrians in accordance with

Section “Pedestrian Considerations” of the WATCH.

Equipment and Material Storage: During periods of construction inactivity, all construction materials and equipment shall be stored by the Contractor as specified in Section “Miscellaneous Considerations, STORAGE OF EQUIPMENT AND MATERIALS” of the WATCH.

Traffic Signals: CDOT will furnish, erect, operate, maintain, relocate, and remove all traffic signal equipment on the Project as necessary in accordance with the Project plans and specifications. The Contractor shall notify the Implementation Section Manager of CDOT at least 30 days prior to the installation, relocation, or removal of traffic signal equipment on the Project. The Contractor shall not disturb any traffic signal equipment unless otherwise noted on the traffic control plans or directed to do so by the Engineer.

Excavation and Trenches: Excavations and trenches that cannot be properly backfilled and patched prior to the end of the workday shall be secured as specified in Section “Excavations and Trenches” of the WATCH.

1. **MEASUREMENT**

Traffic Control will be paid as a unit price for each location. Project location(s) will be defined as the exact location of each RRFB installation.

1. **PAYMENT**

Traffic Control will be paid at the lump sum price for “Traffic Control”. This payment will be full compensation for all elements of work required to complete the Project as specified.

Payment will be made under:

**TRAFFIC CONTROL EA**