HSIP Pedestrian Improvements at Signalized Intersections: Phase 1B

Project Special Provisions

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Prepared for:
City of Richmond
Department of Public Works
Transportation Engineering Division

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2. CONSTRUCTION METHODS.................................................................................................................. 20
  A. GENERAL .......................................................................................................................................... 20
  B. REGULATIONS AND CODES .......................................................................................................... 21
  C. UTILITY SERVICES .......................................................................................................................... 21
  D. MAINTENANCE AND REPAIR OF MATERIAL ............................................................................... 22
  E. INSPECTIONS .................................................................................................................................... 23
  F. REMOVAL OFExisting EQUIPMENT AND MATERIAL .................................................................. 23
  G. WIRE AND CABLE ............................................................................................................................ 23
  H. CONTRACTOR’S OFFICE .................................................................................................................. 23
  I. ELECTRICAL REQUIREMENTS ........................................................................................................ 23

SECTION 801 – TRAFFIC SIGNAL CONDUIT.......................................................................................... 25
  801.02 – MATERIALS ............................................................................................................................. 25
  801.03 – PROCEDURES .......................................................................................................................... 25
  801.04 – MEASUREMENT AND PAYMENT ......................................................................................... 29

SECTION 802 - BOLLARDS .................................................................................................................. 31
  802.01 – DESCRIPTION .......................................................................................................................... 31
  802.02 – MATERIALS ............................................................................................................................ 31
  802.03 - PROCEDURES .......................................................................................................................... 31
  802.04 – MEASUREMENT AND PAYMENT ......................................................................................... 31

SECTION 803 - CPM PROGRESS SCHEDULE .................................................................................. 32
  1. GENERAL REQUIREMENTS ............................................................................................................. 32
  2. OVERVIEW OF THE VARIOUS REQUIRED PROGRESS SCHEDULE SUBMISSIONS ...................... 33
     A. PRELIMINARY PROGRESS SCHEDULE ....................................................................................... 33
     B. PROGRESS SCHEDULE UPDATE ................................................................................................. 34
     C. REVISED PROGRESS SCHEDULE ............................................................................................... 35
     D. FINAL AS-BUILT PROGRESS SCHEDULE ..................................................................................... 36
     E. ROLLING TWO-WEEK LOOKAHEAD ............................................................................................ 36
  3. SCHEDULE IMPACT ANALYSIS (SIA) FOR CHANGES AND DELAYS .............................................. 36
     A. CHANGES, DELAYS, AND SCHEDULE IMPACTS ......................................................................... 36
     B. SCHEDULE IMPACT ANALYSIS (SIA) ......................................................................................... 38
  4. DETAILED REQUIREMENTS FOR PROGRESS SCHEDULE SUBMISSIONS .................................. 39
     A. PROGRESS SCHEDULE .................................................................................................................. 39
     B. PROGRESS SCHEDULE NARRATIVE ............................................................................................ 42
  5. REPORTING AND SUBMITTAL REQUIREMENTS FOR PROGRESS SCHEDULE SUBMISSIONS ..... 43
6. FAILURE TO SUBMIT PROGRESS SCHEDULES ................................................................. 44
7. REVIEW AND ACCEPTANCE ......................................................................................... 45
8. MONITORING THE WORK AND ASSESSING PROGRESS ........................................... 45
   A. MONITORING THE WORK ......................................................................................... 45
   B. PROGRESS EVALUATION ....................................................................................... 46
   C. PROGRESS DEFICIENCY AND SCHEDULE SLIPPAGE .......................................... 46
9. MEASUREMENT AND PAYMENT ............................................................................... 47
SECTION 106 – CONTROL OF MATERIAL

106.01 – SOURCE OF SUPPLY AND QUALITY REQUIREMENTS

The Specifications are amended to include the following:

All equipment shall be produced new, within six (6) months of install date, and warehoused by the manufacturer with lot numbers traceable to production dates and quality test dates. No discontinued equipment or materials shall be installed under this Contract.
SECTION 109 – MEASUREMENT AND PAYMENT

109.08 – PARTIAL PAYMENTS

The Specifications are amended to include the following:

(a) General

The Contractor shall rectify pay item quantities on a daily basis with the Engineer or his/her representative. Daily quantities will be used to calculate monthly progress payments.
SECTION 504 – SIDEWALKS, STEPS, AND HANDRAILS

504.03 – PROCEDURES

The Specifications are modified as follows:

(a) Sidewalks

Hydraulic Cement Concrete Sidewalk shall be modified to include sidewalk, concrete driveway, and concrete median installation. In addition, repair and replacement of existing concrete sidewalk, concrete driveway, or concrete median will also be paid for under this item. For repair of sidewalks and walkways, remove entire section of slab from joint to joint and replace. Replacement shall be in accordance with the most recent version of the City of Richmond Right-of-Way Excavation and Restoration Manual and the City of Richmond Department of Public Works Special Provisions.

Sidewalks should be permanently restored within seven (7) calendar days of disturbance. If a sidewalk cannot be permanently restored within seven (7) calendar days, it shall be temporarily restored with cold patch material. Cold patch material shall be applied in one lift, approximately 2 inches thick or greater and shall be flush with adjacent sidewalk surface. Temporary patch material shall not remain in place for more than seven (7) calendar days.

504.04 – MEASUREMENT AND PAYMENT

The Specifications are modified as follows:

Hydraulic Cement Concrete Sidewalk (Depth) will be measured in square yards of finished surface for a 4” deep sidewalk, driveway, or median, complete-in-place, and will be paid for at the Contract unit price per square yard. Each structure located within the limits of the sidewalk/median having an area greater than one square yard will be excluded in computing the square yards of sidewalk eligible for payment. Price shall include removal and disposal of existing concrete sidewalk, driveway, or median section.

Payment will be made under:

Pay Item  Pay Unit
Hydraulic Cement Concrete Sidewalk (4”) ................................................................. Square Yards
SECTION 510 – RELOCATING OR MODIFYING EXISTING MISCELLANEOUS ITEMS

510.02 – MATERIALS

The Specifications are amended to include the following:

Existing cabinets are to be removed where indicated on the Plans and salvaged by the Contractor. Measurement and payment for removal and salvage of cabinets will be made under Section 703 – Traffic Signals.

Cabinet entry modifications are to be performed where indicated on the Plans. Use of high density polyethylene (HDPE), polyvinyl chloride (PVC), and rigid galvanized steel (RGS) conduit, fasteners, and conduit bodies are required as indicated on the Plans and in the Specifications.

Street furniture is to be relocated when indicated on the Plans. Mounting hardware shall conform to manufacturers specifications. Hydraulic Cement Concrete Sidewalk shall conform to Section 504 – Sidewalks, Steps, and Handrails. Select fill material shall conform to Section 207 of the VDOT Road and Bridge Specifications. Topsoil shall conform to Section 244 of the VDOT Road and Bridge Specifications. Seeding shall conform to Section 244 of the VDOT Road and Bridge Specifications. Bedding material for sidewalk shall conform to Section 109 of the VDOT Road and Bridge Specifications.

510.03 – PROCEDURES

The Specifications are amended to include the following:

(a) General

All salvaged equipment shall be returned to the Transportation Engineering Division Shop between the hours of 8:00 AM and 3:30 PM Monday through Friday, or at a time/place mutually agreed to by the Contractor, Engineer, and Signal Technician. The Contractor shall coordinate delivery of salvaged items with the Transportation Engineering Division Shop at (804) 646-1466 at least three (3) business days in advance. Label all returned equipment and material to indicate the location from which it was removed. The City will deduct the cost of City-owned equipment damaged by the Contractor from money due to the Contractor.

The Contractor shall be responsible for hauling and disposing of all waste from the project site including but not limited to disposal of signal or communications equipment, unsuitable fill material, excess material from excavations associated with the project, etc. The Contractor shall be responsible for hauling and disposing of all waste in accordance with Federal, State, and local regulations. No separate measurement or payment shall be made for disposal of any material from the project site.

The Contractor shall salvage all cobblestone or brick paving materials when removed for excavation associated with the proposed work. Any excess cobblestone or brick paving materials not
used for site restoration shall be salvaged and returned to the Transportation Engineering Division Shop between the hours of 8:00 AM and 3:30 PM Monday through Friday, or at a time/place mutually agreed to by the Contractor, Engineer, and Signal Technician.

If the Contractor discovers any City items or materials not specifically listed in these specifications, the Contractor shall coordinate with the Engineer to determine whether the items or materials removed shall be salvaged or disposed.

(b) Modify Existing Cabinet Entry

Excavation and installation of conduit under this pay item shall include any conduit necessary to reach between the existing signal cabinet and the nearest traffic signal pole or junction box (existing or proposed) as indicated on the Plans. The Contractor shall ensure the seal between the entry and the cabinet is made weatherproof using an approved sealant. Work associated with excavation and restoration of the site to accommodate the conduit installation shall be considered incidental to the cabinet entry modification including backfilling, compacting, disposal of all surplus and unsuitable materials and site restoration.

(c) Modify Existing Cabinet Foundation

Install the proposed cabinet on existing foundations where indicated on the Plans. Remove the existing cabinet and salvage all equipment and lead in cables with the exception of traffic signal controllers. Traffic signal controllers shall be relocated to proposed cabinet unless otherwise specified on the Plans. The Contractor shall not cut any cables or conductors unless indicated on the Plans or instructed by the Engineer. The Contractor is responsible for salvaging all cabinets as identified on the Plans.

Prior to installing the new cabinet, conduct an inspection of the existing foundation to find any surface cracks. Grout and seal all cracks with an approved epoxy or polyurethane material.

If the existing cabinet foundation is not large enough to accommodate installation of the proposed cabinet, the Contractor shall extend the existing concrete foundation. The Contractor shall use rebar within the foundation extension such that the new concrete adheres to the existing concrete.

Where necessary, install new bolts into the foundation according to the manufacturer provided bolt pattern. Use a minimum of four ½ inch diameter expanding type anchor bolts to secure the cabinet to foundation. Drill to a minimum depth of 4 inch and seal with an approved epoxy. Saw cut any unused existing bolts prior to cabinet installation.

Install new conduits where necessary and reuse existing conduit stubouts whenever possible. Where approved by the Engineer, install conduit entrances into existing foundations in accordance with the Plans. Install new conduits by drilling a hole in the foundation. Locate the hole as close to the
center of the foundation as possible to reduce cracking.

Silicone sealant must be installed around any conduit penetration to the cabinet. Grout and sealant material must be waterproof and anti-corrosive and be approved by the Engineer. Silicone sealant must be waterproof and be approved by the Engineer.

Secure ground mounted cabinets using manufacturer provided fasteners. Seal space between cabinet base and foundation with permanent, flexible, waterproof sealing material.

Modify existing foundations in accordance with the Plans. At locations where sidewalk, brick pavers, surface treatments, or landscaping treatments are removed or damaged as part of the cabinet foundation modification, replace and restore to preconstruction condition using same material as approved by the Engineer. For repair of sidewalks and walkways, remove entire section of slab from joint to joint and replace.

Contractor shall place all equipment/items within a single section of slab whenever possible to limit concrete repair area.

(d) Modify Existing Junction Box

The Contractor shall perform all modifications to existing junction boxes as called for on the plans. The Contractor shall modify existing junction boxes to accommodate additional conduit entries as indicated on the plans. The Contractor shall fill any voids resulting from the entrance of additional conduits with an approved sealant. The Contractor shall ensure that no other conduits are damaged in the process of modifying existing junction boxes. The Contractor shall be responsible for repairing any conduits or cables that may be damaged during work on the existing junction boxes at no cost to the City. The Contractor shall restore the cover of the junction box including bolts.

(e) Adjust Existing Video Detection Zone

Adjust existing video detection zone shall be in accordance with Section 510 of the 2020 VDOT Road and Bridge Specifications. Adjustment shall be made to each video detection zone such that the zones are five feet in front of the stop bar and located fully within the traffic lane being detected. Contractor will verify the functionality of the zones and will be subject to acceptance testing requirements for video detection equipment.

(f) Remove Existing Pedestrian Pushbutton

The Contractor shall remove existing pedestrian pushbuttons at the locations specified on the Plans or as directed by the Engineer. The Contractor shall be responsible for disposal of removed, existing pedestrian pushbuttons.

(g) Relocate Miscellaneous Street Furniture
The Contractor shall remove existing mounting hardware, if present, and dispose of hardware. The Contractor shall remove existing foundations, if present, in their entirety. The Contractor shall restore existing surface to match adjacent site conditions.

If existing street furniture is mounted in earthen area, the Contractor shall restore area to existing grade using select fill material, if necessary, and a minimum of 3” of topsoil material and permanent seed the area.

If existing street furniture is mounted to concrete sidewalk, the Contractor shall remove damaged sidewalk in full sections to the nearest joint. Sidewalk shall be considered damaged if the existing mounting hardware was affixed to or through the sidewalk or if the sidewalk is cracked, chipped, or otherwise damaged during street furniture removal at the discretion of the Engineer. The Contractor shall restore bedding material if removed to prepare the base for new sidewalk.

Street furniture shall be mounted in proposed location using hardware and procedures in conformance with manufacturer’s specifications.

510.04 – MEASUREMENT AND PAYMENT

The Specifications are amended to include the following:

Modify Existing Cabinet Entry will be measured and paid for at the Contract unit price as the actual number of locations modified. No separate measurement will be made for equipment, conduit, conduit bodies, sealant, excavation, backfilling, compacting, disposal of all surplus and unsuitable materials, restoration of surrounding surface, materials, fasteners, or any other hardware necessary to perform the work. No separate measurement will be made for conduit necessary to reach between the existing equipment cabinet and the nearest traffic signal pole or junction box. No measurement will be made for individual modifications at a location.

Modify Existing Cabinet Foundation shall be measured in units of each and will include excavation necessary to attach to existing stubbed-out conduits, drilling for new conduits, anchor bolts, washers, nuts, bolt circle templates, lubricant, torque, ultrasonic test on anchor bolts, grounding electrodes (including grounding electrode clamps, grounding electrode conductors, and installation), conduits, testing grounding conductor-to-electrode continuity, excavating, backfilling, compacting, disposing of surplus and unsuitable material, and restoring disturbed areas, and as needed temporary support of the existing signal cabinet, temporary signalization, and temporary intersection control.

Modify Existing Junction Box will be measured and paid for at the Contract unit price as the actual number of existing junction boxes modified. No separate measurement will be made for equipment, materials, fasteners, tools, sealant, excavation, backfilling, compacting, disposal of all surplus and unsuitable materials, restoration of surrounding surface, necessary repairs to any damaged cabling or
conduit, or any other hardware necessary to perform the work.

**Adjust Existing Video Detection Zone** shall be measured in unit of each, per intersection. Separate payment will not be made to adjust multiple video detection zones at a single intersection. This price shall include resetting, adjusting, modifying, and relocating the existing video detection zones.

**Remove Existing Pedestrian Pushbutton** will be measured in units of each and will be paid for at the contract unit price per each. This price shall be full compensation for all necessary labor, materials, equipment, tools, and supplies as may be required to disconnect the pedestrian pushbuttons from existing conductor cables, remove the pushbutton, remove all associated mounting equipment, hardware, and accessories, and salvage and return or salvage and dispose per the Engineer’s direction.

**Relocate Miscellaneous Street Furniture** will be measured in units of each and will be paid for at the contract unit price per each. This price shall include full compensation for all necessary labor, materials, equipment, tools, and supplies as may be required to remove existing mounting hardware and foundation, restore existing surface, and install item in new location.

Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modify Existing Cabinet Entry</td>
<td>Each</td>
</tr>
<tr>
<td>Modify Existing Cabinet Foundation</td>
<td>Each</td>
</tr>
<tr>
<td>Modify Existing Junction Box</td>
<td>Each</td>
</tr>
<tr>
<td>Adjust Existing Video Detection Zone</td>
<td>Each</td>
</tr>
<tr>
<td>Remove Existing Pedestrian Pushbutton</td>
<td>Each</td>
</tr>
<tr>
<td>Relocate Miscellaneous Street Furniture</td>
<td>Each</td>
</tr>
</tbody>
</table>
SECTION 512 – MAINTAINING TRAFFIC

512.03 – PROCEDURES

The Specifications are amended to include the following:

(y) Off Duty Uniformed Police: The Contractor is to coordinate assistance by Richmond Police Department officers to maintain traffic during scheduled traffic signal downtime and as approved by the Engineer. The Contractor shall not use off duty uniformed police during City of Richmond holidays without advanced approval from the Engineer. Off duty uniformed police shall be employed in accordance with the most recent version of the City of Richmond Department of Public Works Special Provisions.

The Contractor shall obtain and complete an Extra-Duty Employment Request form from the Richmond Police Department no later than five (5) business days prior to the anticipated work date. Both the form and return address for the completed application are provided at the following web address:

http://www.richmondgov.com/Police/Forms.aspx#

The Contractor is to follow all regulations set forth by the Richmond Police Department regarding Extra-Duty Employment.

512.04 – MEASUREMENT AND PAYMENT

The Specifications are amended to include the following:

All work shall be in accordance with the latest version of the Virginia Work Area Protection Manual (VWAPM) and the Virginia Supplement to the Manual on Uniform Traffic Control Devices (MUTCD), as directed by the Engineer. If the Contractor elects to use more materials than required by the aforementioned manuals or elects to use a more expensive Contract item than the item required for the work, then this work shall be paid for at the Contractor’s own expense.

Off Duty Uniformed Police will be measured in units of hours of assistance provided to maintain traffic and will be paid for at the unit price established by the Richmond Police Department and in accordance with the City of Richmond Department of Public Works Special Provisions. Payment shall be made to the officer(s) in accordance with standard City Agreement for Extra-Duty Police Officers.

Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off Duty Uniformed Police</td>
<td>Hour</td>
</tr>
</tbody>
</table>
SECTION 513 – MOBILIZATION

513.04 – MEASUREMENT AND PAYMENT

The Specifications are amended to include the following:

**Mobilization** will be measured and paid for at the Contract lump sum price.

Partial payments for mobilization will be made with the first and second partial pay estimates paid on the contract, and will be made at the rate of 50% lump sum price on each of these partial pay estimates. Such price and payment includes but is not limited to the movement of personnel, equipment, supplies, and incidentals to the project site, for the establishment of offices, buildings, and other facilities necessary for work on the project; the removal and disbandment of those personnel, equipment, supplies, incidentals, or other facilities that were established for the prosecution of work on the project; and for all other work and operations that shall be performed for costs incurred prior to beginning work on the various items on the project site. Price shall also include any public announcements associated with maintenance of traffic and construction impacts to traffic.

Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobilization</td>
<td>Lump Sum</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SECTION 700 – GENERAL

700.05 – PROCEDURES

The Specifications are amended to include the following:

(c) Concrete Foundations

Use a minimum of four 1/2 inch diameter expanding type anchor bolts to secure the cabinet to foundation.

Seal space between cabinet base and foundation with permanent, flexible, waterproof sealing material.

Coordinate with City Transportation Engineer and City Signal Systems Engineer for approval of proposed cabinet locations prior to installing concrete foundations.

(g) Conductor Cables

Coaxial cable shall be suitable for outdoor installation and approved by the City of Richmond. Coaxial cables shall be furnished and installed in accordance with Section 238 and Section 700 of the 2020 VDOT Road and Bridge Specifications.

(i) Junction Box

Provide junction box covers with standard TRAFFIC logos, pull slots, stainless-steel bolts, and a non-skid surface. Install junction boxes flush with finished grade. Do not install sealant compound between junction boxes and covers. Install junction boxes in the location and of the size shown on the Plans.

At certain locations shown on the Plans, reuse existing junction boxes and handholes. Do not damage existing junction box or handhole or existing junction box or handhole contents. Junction boxes, handholes, or cable damaged shall be replaced at the Contractor’s expense.

Contractor shall place all junction boxes within a single section of sidewalk slab whenever possible to limit concrete repair area.

700.06 – MEASUREMENT AND PAYMENT

The Specifications are amended to include the following:

Coaxial Cable shall be measured in units of in linear feet and will be paid for at the contract unit price per linear foot. This price shall include cables, breakaway connections, markings and identifications, splice kits, electrical tape, testing, and connections.

Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coaxial Cable</td>
<td>Linear Feet</td>
</tr>
</tbody>
</table>
SECTION 703 – TRAFFIC SIGNALS

703.02 – EQUIPMENT

The Specifications are amended to include the following:

(b) Traffic Signal Equipment Cabinets

Furnish and install City Standard TS 2 Cabinet at the locations shown in the Plans or as directed by the Engineer. Supply Econolite TS 2 Type 1 P44 ground mounted traffic signal cabinets. Each new cabinet shall include:

- One (1) MMU-16E
- One (1) power supply
- Three (3) bus interface units (BIU)
- Eight (8) load switches
- Six (6) flash transfer relays
- One (1) two circuit cabinet flasher

Traffic on existing roadways must be maintained at all times during construction. The Contractor shall coordinate with City Transportation Engineer and City Signal Systems Engineer for approval of proposed traffic signal cabinet locations prior to installing concrete foundations.

(c) Power Distribution Strips

Each new equipment cabinet shall be equipped with a power distribution strip. The power distribution strips shall have six NEMA 5-15R receptacles and provide integral surge suppression rated at 25,000 amps (NM) / 25,000 amps. Surge suppression shall be provided for hot to neutral, hot to ground, and neutral to ground. The power distribution strip shall also provide receptacle isolation to prevent plugged-in components from interfering with one another. Power distribution strips shall not be GFCI protected nor shall the circuit to which they are connected. Power strips shall be wired directly to an existing non-GFCI circuit breaker or to the detector panel within the cabinet.

The power strips shall have integral indicator lights that are lit while the strip is powered on. The cord and plug shall conform to standards addressed in Article 400 (Flexible Cords and Cables) and Article 210 (Branch Circuits) of the NEC. The power strips shall provide integral EMI/RFI protection conforming to UL 1283.

Mount power distribution strip within the cabinet as approved by the Engineer. Ensure power distribution strip and any connecting wiring does not interfere with operation of the cabinet door.
(f) Detectors

Video detection equipment shall consist of a 360° camera system and all ancillary equipment for full functionality of the system including but not limited to processors, port expanders, and POE injectors. The 360° camera shall be designed and packaged to operate properly in an outdoor environment. The 360° camera shall be mounted on the signal pole (not on the mast arm). In the event that one 360° camera is not sufficient to cover all movements at an intersection, the Contractor shall install two or more 360° cameras to cover all movements at each intersection.

The 360° camera shall be optimized for real time vehicle detection. The system shall be designed so that a single high-resolution camera can be utilized to cover the entire intersection wherever feasible when mounted on the vertical signal pole. The system shall detect and track vehicles from any angle of approach to the intersection. The camera shall be controlled via image processing software and provide images that are properly exposed for use by the image processing algorithms.

The CPU shall be designed to capture and process images from the 360° camera at a rate of 5 frames per second. The CPU shall provide power and communications to the camera through a single cable. The CPU shall contain 24 parallel inputs and outputs which can be utilized for detector outputs and phase inputs. The CPU shall provide an SDLC interface for TS 2 controllers and implement the NEMA standard protocol.

The 360° camera system shall provide presence detection. The system shall detect the presence of vehicle(s) and provide indication of the detection via a parallel output or via the SDLC interface. The presence detection shall be configurable to provide a delay between when a vehicle is detected and when the indication of the delay is indicated. The user shall be able to specify the delay in 1 second increments. If specified, the delay shall be applied on detection in zones that do not have a green light. The detection zones shall be user definable. The zones may be of any size and shape. The user shall define the zones by selecting points within the image to create a closed area. Once the definition of the zone is complete, the user shall be able to specify the phase associated with the zone as well as the parallel output pin or logical output in the SDLC protocol. The direction of normal traffic flow shall be definable to prevent false calls associated with vehicles moving the wrong direction through a zone. The system shall determine a vehicle to be “present” when the majority of the object falls within a user defined zone. The imaging software shall then use the user defined parameters to determine if the indication of presence will be delayed, which output to use, and which phase is associated with zone. The CPU shall provide an SDLC interface which communicates with controllers utilizing the protocol defined in the NEMA TS 2 specification. The interface shall conform to the RS-485 specification and supports multi-drop operation. The CPU shall be programmed to answer to up to four BIU addresses (8 to 11) giving the CPU the capability to have 64 outputs. The CPU shall contain an Ethernet interface so that the system can be placed on a wide-area network.
The interface shall operate at 10 Mbs, 100 Mbs or 1000 Mbs. The interface shall operate with a fixed IP address or utilize DHCP to receive the IP address that it will use. The CPU shall have a female RJ-45 connector for connection to the network.
The CPU shall operate on AC voltage in the range of 90 to 240 volts 50/60 hertz.

703.03 – PROCEDURES

The Specifications are amended to include the following:

(d) Furnish and Install Traffic Signal Equipment Cabinet

The Contractor shall coordinate with City Transportation Engineer and City Signal Systems Engineer for approval of proposed traffic signal cabinet locations prior to installing concrete foundations. The contractor shall mark the proposed location with tape or paint and contact the Engineer seven days prior to installation for approval.

Where installing a new traffic signal equipment cabinet, the Contractor is to remove and salvage the existing cabinet. Remove the existing cabinet and salvage all equipment and lead in cables with the exception of traffic signal controllers. Traffic signal controllers shall be relocated to proposed cabinet unless otherwise indicated on the Plans. The Contractor shall not cut any cables or conductors unless indicated on the Plans or instructed by the Engineer. Route all cables into and out of the cabinet as indicated on the Plans. Install cables using pull rope.

The Contractor shall install an MMU in all new traffic signal cabinets. The Contractor shall remove and salvage the existing conflict monitor. The IP-based MMU shall be configured to operate on the same VLAN as the signal controller.

In locations where a new ground mounted traffic signal equipment cabinet will be installed in lieu of an existing pole mounted cabinet, the Contractor shall seal the hole(s) in the signal pole to which the cabinet and associated conduit elbows were mounted. The Contractor shall use a 1/4 inch thick, galvanized steel plate on the exterior of the pole to cover the hole(s) with at least a three (3) inch overlap around all edges of the hole. Use manufacturer-approved grommets and sealants that are listed and rated for this type of installation. Use four (4) 1/4 inch stainless steel screws to mount the plate to the signal pole. The Contractor shall submit method of attachment to the Engineer for approval prior to installation. The plate shall be painted to match the City of Richmond’s standard signal pole color. The City of Richmond currently uses Federal Green #14077 from the below product line:


All salvaged equipment shall be returned to the Transportation Engineering Division Shop between the hours of 8:00 AM and 3:30 PM Monday through Friday, or at a time/place mutually agreed to by the Contractor, Engineer, and Signal Technician. The Contractor shall coordinate delivery of salvaged
items with the Transportation Engineering Division Shop at (804) 646-1466 at least three (3) business days in advance. Label all returned equipment and material to indicate the location from which it was removed. The City will deduct the cost of City-owned equipment damaged by the Contractor from money due to the Contractor.

703.04 – MEASUREMENT AND PAYMENT

The Specifications are amended to include the following:

**360° Video Detection** shall be measured in units of each and will be paid for at the contract unit price per each. This price shall include the camera, environmental housing, mounting bracket, tube, brackets, clamps, pole attachment, fittings, mounting hardware, testing, necessary cable and incidentals including but limited to processors, port expanders, and POE injectors. Where non-standard mounting brackets are required, the price shall include the provision of shop drawings, methods and materials for fabrication and installation, and associated labor and incidentals.

**Furnish and Install City Standard Traffic Signal Cabinet (Type)** shall be measured and paid for at the Contract unit price per each cabinet that is furnished, installed, and accepted. Price shall include all labor, cabinet foundation, attachment hardware, conduit and fittings, MMU, power supply, BIUs, detector rack, detector cards, power distribution strip, and items required to provide a complete working assembly at the local intersection. No separate payment will be made for standoffs, meter bases, and service disconnects and work will be considered incidental to the cost of the cabinet when required. Relocation of the existing controller at the intersection shall be included with this item. Removal and salvage of existing cabinets shall be considered incidental to the cost of installing a new cabinet.

Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>360° Video Detection</td>
<td>Each</td>
</tr>
<tr>
<td>Furnish and Install City Standard Traffic Signal Cabinet (Ground Mount)</td>
<td>Each</td>
</tr>
</tbody>
</table>
SECTION 800 – GENERAL REQUIREMENTS

1. DESCRIPTION

A. 2020 VDOT ROAD AND BRIDGE SPECIFICATIONS
   Conform to State Corporation Commission (SCC) requirements, City of Richmond Codes and Guidelines, these Project Special Provisions, the Plans, and the 2020 VDOT Road and Bridge Specifications.

   In the event of a conflict between these Project Special Provisions and the 2020 VDOT Road and Bridge Specifications, these Project Special Provisions shall govern.

B. GENERAL
   The HSIP Pedestrian Improvements at Signalized Intersections Phase 1B project will provide general construction services that include, but are not limited to, removing existing signal equipment, install pavement markings, ADA curb ramps, signs, pedestrian countdown signals, pedestrian pushbuttons, pedestal poles, video detection, and traffic signal modifications.

C. PRE-APPROVED PRODUCTS
   Furnish new equipment, materials, and hardware unless otherwise specified. Inscribe manufacturer’s name, model number, serial number, and any additional information needed for proper identification on each piece of equipment housed in a case or housing.

   Furnish materials and equipment from VDOT’s Pre-Approved Traffic Control Device Listing by the date of installation, where applicable. Equipment, material, and hardware not pre-approved when required will not be allowed for use on the project. The latest version of the Pre-Approved Traffic Control Device Listing can be found at: http://www.virginiadot.org/business/trafficeng-productlists.asp.

D. OBSERVATION PERIOD
   Contractor shall guarantee workmanship and Contractor-furnished equipment for a 90-day observation period under the payment and performance bond from date of acceptance.

   If workmanship or equipment fails during the 90-day observation period, Contractor shall repair or replace with new equipment and begin a new 90-day observation period.

   All project documentation shall be submitted to the Engineer prior to completion of the 90-day observation period by the Contractor.

   The observation period for this work will be incidental to the work to be completed by the project completion date.
E. WARRANTIES

Unless otherwise required herein, provide manufacturer’s warranties on Contractor-furnished equipment for material and workmanship that are customarily issued by the equipment manufacturer and that are at least one (1) year in length from the date of final acceptance for the system. Include unconditional coverage for all parts and labor necessary or incidental to repair of defective equipment or workmanship and malfunctions that arise during the warranty period.

Ensure all Contractor-furnished equipment, including pieces and components of equipment, hardware, firmware, software, middleware, internal components, and subroutines which perform any date or time data recognition function, calculation, or sequencing will support a four digit year format for a period of at least 50 years as well as automatic daylight savings time adjustment.

Upon successful completion of the 90-day observation period, transfer manufacturer’s warranties with proper validation by the manufacturer to the City or its designated maintaining agency.

2. CONSTRUCTION METHODS

A. GENERAL

Before beginning signal work, verify all existing signal equipment is in satisfactory working order. Report all defective signal equipment to the Engineer so as not to be held responsible for defects.

Once cabinet replacement has begun at a given location, complete the removal, replacement, and surface restoration work at that location before beginning work at another location.

Locate existing conduit, cable runs, inductive detection loops, lead-in, junction boxes, handholes, and detection equipment before installing or using equipment that can damage or interfere with such facilities.

Locate all underground utilities before beginning drilling, digging, or trenching operations. All subsurface investigation shall be the responsibility of the Contractor. Clearing/excavating junction box, handhole, or manhole covers shall be the responsibility of the Contractor.

The Contractor shall provide a minimum thirty (30) days written notice to Dominion Energy prior to commencing associated construction activities. Coordinate with Stephen Lackey at (804) 379-4873.

Immediately cease work and notify the Engineer and affected owners if damage to existing utilities, cables, or equipment occurs due to the Contractor’s work being performed under this Contract. Make all required repairs and replacements at no additional cost to the City.

Utilize IMSA Level II Technicians to perform or directly supervise all work requiring access within a traffic signal cabinet. Wire cabinets including the phasing, type of operation (time-based, volume density, or special sequences), loop to phase assignments, phase numbering assignments, and detection schemes as directed by the Engineer.
At the end of each workday, clean and clear the work site of excess excavation, waste packing material, wire, and all other debris that results from work. Haul and dispose of all waste as required by Section 106 of the Specifications. No separate measurement or payment shall be made for disposal of waste. Waste disposal shall be considered incidental to the related pay item.

All proposed work will occur within the existing right-of-way. Should the Contractor require access to private property during construction (e.g. for material storage, equipment placement) it shall be the Contractor’s responsibility to coordinate with property owners and obtain proper temporary easements as necessary. The Contractor shall be responsible for repairing any damage that occurs to private property during construction activities at the Contractor’s own expense.

All erosion and sediment control measures shall be considered incidental to other work and shall not be measure or paid for separately. This shall include, but not be limited to, safety fence, silt fence, storm drain inlet protection, outlet protection, rock check dams, temporary seeding, permanent seeding, blanket matting, and tree protection. All materials, tools, safety equipment, or ancillary items required to conform with applicable erosion and sediment control regulations and codes shall be considered incidental to other work on the project.

B. REGULATIONS AND CODES

Furnish material and workmanship conforming to the NEC, NESC, UL, and all local safety codes in effect on the date of advertisement. In the event of a conflict between the NEC, NESC, and the UL, local safety codes in effect on the date of advertisement and these Project Special Provisions, the cited documents will govern.

At locations and during activities where applicable, conform to ITE, IEEE, AASHTO, and ASTM standards in effect on the date of advertisement.

Notify the Engineer, local traffic enforcement agency, and local utility company seven (7) business days before required operational shutdowns to coordinate connection or disconnection to an existing utility or system.

C. UTILITY SERVICES

Coordinate all work to ensure electrical power of proper voltage, phase, frequency, and amperage is available to complete the work. Use electrical service cables with THWN insulation.

When electrical, telephone, and telecommunication service is not furnished by the City and is required, contact the utility company and make application to ensure all work can be completed. Obtain authorization for service in the City’s name and make application for service in the City’s name. The Contractor will be responsible for all expenses associated with utility installation costs and hookups.
D. MAINTENANCE AND REPAIR OF MATERIAL

Furnish the Engineer with the name, office telephone number, and/or mobile telephone number (with 24 hours a day, 7 days a week coverage) of the supervisory employee who will be responsible for maintenance and repair of equipment during all hours. An up to date list of these names and phone numbers shall be given to the Engineer. Any changes in personnel affecting this list shall be immediately communicated to the Engineer in writing.

Maintain and repair all signal and communications related equipment within the project construction limits until completion of the observation period and receipt of written notification of final acceptance of the project.

For all failures, malfunctions, or damages to equipment that are critical to signal operations or signal timing, begin necessary repairs within two (2) hours of notification. Complete repairs within four (4) hours of notification. Comply with Section 512 of the 2020 VDOT Road and Bridge Specifications for maintenance of traffic flow. The inability to contact the supervisory employee or prearranged alternate will not extend repair time requirements.

Remove and replace all signal and communications related equipment that fails. The City will furnish the Contractor replacement equipment for City-furnished equipment that fails.

Except for damages and malfunctions caused by the Contractor’s work activities, the Contractor will not be held responsible for pre-existing conditions reported to the Engineer before starting traffic signal work at the specific intersection. The Contractor will assume responsibility for all maintenance and emergency services necessary once traffic signal work has begun at the specific intersection and for all damages and malfunctions caused either directly or indirectly by the Contractor’s work activities. Contractor shall repair scratches, dents, or other damage to the cabinet that occur while the cabinet is under the Contractor’s responsibility.

In the event the Contractor fails to perform in accordance with the Plans and Specifications within the time frame specified, the City reserves the right to perform maintenance and emergency service necessary to ensure continuous traffic signal operation. Further, all expenses incurred by the City in implementing this option will be deducted from payment due the Contractor, plus $250 liquidated damage per occasion, per day, or any portion thereof, until corrected.

The Contractor shall maintain traffic signal system equipment until completion of the 90-day Observation Period and written notification of final acceptance of the project has been received from the Engineer.
E. INSPECTIONS

The City may access the Contractor’s equipment to perform preventative maintenance inspections or conflict monitor/Malfunction Management Unit certification as necessary. The Contractor shall be present for these inspections.

F. REMOVAL OF EXISTING EQUIPMENT AND MATERIAL

Assume ownership of any removed cabinet foundations, junction boxes, handholes, and supporting hardware. Return all salvaged equipment to the Transportation Engineering Division Shop between the hours of 8:00 AM and 3:30 PM Monday through Friday, or at a time/place mutually agreed to by the Contractor, Engineer, and Signal Technician. The Contractor shall coordinate delivery of salvaged items with the Transportation Engineering Division Shop at (804) 646-1466 at least three (3) business days in advance. Replace or repair all material lost or damaged during its removal and transit. Label all returned equipment and material to indicate the location from which it was removed. The City will deduct the cost of City-owned equipment damaged by the Contractor from money due to the Contractor.

G. WIRE AND CABLE

For installation in a conduit system, lubricate cable and wires before installing in conduit. Use lubricant that will not physically or chemically harm cable jacket, wire insulation, and conduit. Lubricant must conform to the cable and wire manufacturer’s recommendations. The lubricant shall contain no greases, silicones, or waxes. The lubricant shall be a pourable liquid with good wetting (coating) properties. It shall have a friction coefficient less than 0.15 using MDPE-jacketed cable and HDPE innerduct. The lubricant shall not stress crack polyethylene when tested by ASTM 1693.

Splice all electrical wire and cable at recessed-screw, barrier type terminal blocks, in junction boxes / handholes / manholes or in condulets. Maintain color coding of wires through splices.

Protect ends of wire and cable from water and moisture.

Install all wire and cable with necessary hardware including, but not limited to shoulder eyebolts, washers, nuts, thimble eyelets, three-bolt clamps, J-hooks, split bolt connectors and grounding clamps.

H. CONTRACTOR’S OFFICE

Throughout the project until final acceptance, the Contractor shall maintain a storage and staging area within the Richmond City Limits. This storage area must provide adequate space to contain all necessary materials, equipment, etc. that is required for completion of the work.

I. ELECTRICAL REQUIREMENTS

All electrical equipment shall conform to the applicable standards of the National Electrical
Manufacturers Association (NEMA), the Electronic Industries Association (EIA), the International Municipal Signal Association (IMSA), the Rural Development Utilities Program (RDUP) or Rural Utilities Service (RUS), the National Electric Code (NEC), the National Electrical Safety Code (NESC), the Telecommunications Industry Association (TIA), and Underwriters Laboratories (UL).

Furnish materials and workmanship conforming to the latest requirements of the Standards of the American Society for Testing and Materials (ASTM); American National Standards Institute (ANSI); and all local ordinances and regulations.
SECTION 801 – TRAFFIC SIGNAL CONDUIT

801.02 – MATERIALS

The Specifications are amended to include the following:

(a) Conduit Transitions

Splicing or coupling of conduits is prohibited unless written approval is received in advance by the Engineer. Conduit couplings and fittings shall be submitted to the Engineer for review and approval prior to use.

801.03 – PROCEDURES

The Specifications are amended to include the following:

(a) Traffic Signal Conduit Installation Requirements

The Contractor shall follow the conduit installation procedures in Sections 700 and 812 of the 2020 VDOT Road and Bridge Specifications with the following amendments:

General

The Contractor shall install new conduit in locations shown on the Plans or as directed by the Engineer. Method of conduit installation (directional drilling or trenching) shall be as shown on the Plans unless otherwise approved in advance by the Engineer. Install HDPE conduit for all directional drilled underground runs and PVC conduit for all trenched underground runs. Clean existing underground conduit to be incorporated into a new system. Install longitudinal runs of conduit a minimum of one (1) foot from back of curb or six (6) feet from edge of pavement in the absence of curb unless otherwise approved by the Engineer.

Clearance between HDPE or PVC conduit installations and existing utilities shall be in accordance with State Corporation Commission (SCC) requirements and the City of Richmond’s Right-of-way Excavation and Restoration Manual; whichever is more restrictive takes precedence.

Restore all surfaces to permanent condition within seven (7) calendar days of first disturbance. Restore unfinished surfaces (grass, dirt, gravel, etc.) flush with surrounding natural ground. Remove all rock and debris from backfill material. Remove excess material from site and compact area. Backfill with excavated material if suitable or with other material deemed as suitable by the City of Richmond, and compact to 95% of original density. Backfill trench at locations along the trench path where non-movable objects, such as rocks and boulders, cannot be avoided. The purpose of the backfill is to provide a gradual change in elevation of the trench, so that excessive bending and stress will not be transferred to conduits once underground conduit system is installed. For restoration of grass surfaces, rake smooth the top 1 1/2 inches with seed of the same type of
grass as surrounding area. For restoration of concrete surfaces, the Contractor shall follow Section 504 – Sidewalks, Steps, and Handrails. For restoration of paved surfaces, the Contractor shall follow the procedures in Section 801 – Traffic Signal Conduit. For restoration of paved potholes, the Contractor shall follow the procedures in the City of Richmond’s *Right-of-Way Excavation and Restoration Manual*. The Contractor shall be required to restore/reseed any private property damaged during construction.

Permanently restore paved areas with materials matching damaged areas in accordance with the Plans – Trench Cut Restoration Detail. Until permanent pavement restoration takes place, trench excavation within pavement sections shall be temporarily backfilled flush with the adjacent pavement surface with Type I, Size 21A or 21B aggregate. Install cold patch to temporarily maintain traffic where repairs cannot be performed immediately. Cold patch material shall be applied in one lift, approximately 2 inches thick or greater and shall be flush with adjacent pavement surface. Temporary patch material shall not remain in place for more than seven (7) calendar days.

**Directional Drilling**

1. **Depth Requirements**

The Contractor shall verify the location and depth of all underground utilities to be crossed prior to directional drilling conduits. The Contractor shall be responsible for maintaining required separation from existing utilities in accordance with SCC and City of Richmond requirements; whichever is more restrictive takes precedence.

For conduit installation outside of the roadway, maintain a minimum depth of 24 inches below finished grade. Under paved surfaces including roadway and driveways, maintain a minimum depth of 36 inches.

Provide a means of collecting and containing drilling fluid/slurry that returns to the surface such as a slurry pit. Provide measures to prevent drilling fluids from entering drainage ditches and stormwater systems. Prevent drilling fluid/slurry from accumulating on or flowing onto pedestrian walkways, driveways, and streets. Immediately remove all drilling fluids/slurry that are accidentally spilled.

2. **Directional Drill Operations**

Provide grounding for the drill rig in accordance with the manufacturer’s recommendations.

Place excavated material near the top of the working pit and dispose of properly. Backfill pits and trenches to facilitate drilling operations immediately after drilling is completed.
Use equipment suitable for type of material being drilled and drill head sized no more than two (2) inches larger than the outer diameter of the proposed conduit. Direct drill to obtain proper depth and desired destination. Pressure grout with an approved bentonite/polymer slurry mixture to fill all voids. Do not jet alone or wet bore with water.

During drilling operation, locate drill head every ten (10) feet along drill path and before traversing underground utilities or structures. Use digital walkover locating system to track drill head during directional drilling operation. Ensure locating system is capable of determining pitch, roll, heading, depth, and horizontal position of the drill head at any point.

Once drill head has reached final location, remove head, and install back reamer of appropriate size (no more than two (2) inches larger than outer diameter of proposed conduit(s)) to simultaneously facilitate back reaming of drill hole and installation of conduit(s). If more than one conduit is being installed per the Plans, conduits shall be installed simultaneously through a single drill hole. Back reamer is sized larger than actual conduits to ensure conduits are not adversely subjected to deviations caused by the original drill operation and are as straight as practical in their final position.

The intent of the Specifications is to limit the diameter of the actual drill shaft/hole so that it is no more than two (2) inches larger than the proposed conduits outer diameter. The 2-inch larger diameter may be accomplished during the original bore or during the back reaming/conduit installation process. Alternate drilling methods shall be allowed as approved by the Engineer.

Once installation of conduit has started, continue installation without interruption so as to prevent conduit from becoming firmly set. Apply bentonite/polymer slurry mixture during conduit installation.

3. Drilling Fluids

Use lubrication for subsequent removal of material and immediate installation of the conduit. The use of water and other fluids in connection with directional drilling operations will be permitted only to the extent necessary to lubricate cuttings. Do not jet alone or wet bore with water. Use drilling fluid/slurry consisting of at least ten (10) percent high-grade bentonite/polymer slurry to consolidate excavated material and seal drill hole walls.

Transport waste drilling fluid/slurry offsite and dispose of in a method that complies with local, state, and federal laws and regulations.
**Trench Excavation**

1. **Depth Requirements**

The Contractor shall verify the location and depth of all underground utilities to be crossed prior to trenching conduits. The Contractor shall be responsible for maintaining required separation from existing utilities in accordance with SCC and City of Richmond requirements; whichever is more restrictive takes precedence.

For conduit installation outside of the roadway, maintain a minimum depth of 24 inches below finished grade. Under paved surfaces including roadway and driveways, maintain a minimum depth of 36 inches. Maintain a minimum clearance of 24 inches below finished grade when crossing ditch lines.

When trenching conduit, the minimum depth shall be measured from finished grade to the top of the installed conduit unless otherwise approved by the Engineer. Where transitioning to existing conduit systems at a different depth, the Contractor shall utilize 45 degree bends for a gradual transition in elevation/depth.

2. **Modified ECI-1 (Outside Roadway)**

The *2020 VDOT Road and Bridge Specifications* ECI-1 is amended to include the following:

Modified ECI-1 (Outside Roadway) applies to trench excavations performed outside of the roadway in unfinished surfaces (grass, dirt, gravel, etc.) or in finished sidewalk and driveway surfaces.

**(b) Intercept Existing Conduit**

At locations shown on the Plans or as directed by the Engineer, excavate for existing conduit in the location where the interception will occur. The Contractor shall be responsible for excavating an area up to six (6) feet by ten (10) feet with a maximum depth of eight (8) feet. The Contractor shall be responsible for any shoring or stabilizing equipment necessary to prevent the hole from collapsing during excavation and work on the conduit system.

Exposure of the existing conduits and identify the empty conduit to be intercepted. If the conduit anticipated for interception is not empty, notify the Engineer before proceeding. Realign and cut, if necessary, the intercepted conduit such that the conduit will extend a minimum of 2 inches to a maximum of 3 inches into the inside wall of the proposed junction box shown on the Plans.

Ensure that no other conduits are damaged or destroyed during excavation and interception of the conduit or during restoration of the surface. Any damage to other conduits or cabling present within the conduit system shall be repaired at the Contractor’s expense.
Restore all surfaces to permanent condition within seven (7) calendar days of first disturbance. Restore unfinished surfaces (grass, dirt, gravel, etc.) flush with surrounding natural ground. Remove all rock and debris from backfill material. Remove excess material from site and compact area. Backfill with excavated material if suitable or with other material deemed as suitable by the City of Richmond, and compact to 95% of original density. Backfill trench at locations along the trench path where non-movable objects, such as rocks and boulders, cannot be avoided. The purpose of the backfill is to provide a gradual change in elevation of the trench, so that excessive bending and stress will not be transferred to conduits once underground conduit system is installed. For restoration of grass surfaces, rake smooth the top 1 1/2 inches with seed of the same type of grass as surrounding area. For restoration of concrete surfaces, the Contractor shall follow Section 504 – Sidewalks, Steps, and Handrails. For restoration of paved surfaces, the Contractor shall follow the procedures in Section 801 – Traffic Signal Conduit. For restoration of paved potholes, the Contractor shall follow the procedures in the City of Richmond’s Right-of-Way Excavation and Restoration Manual. The Contractor shall be required to restore/reseed any private property damaged during construction.

Permanently restore paved areas with materials matching damaged areas in accordance with the City of Richmond’s Right-of-Way Excavation and Restoration Manual. Until permanent pavement restoration takes place, excavation within pavement sections shall be temporarily backfilled flush with the adjacent pavement surface with Type I, Size 21A or 21B aggregate. Install cold patch to temporarily maintain traffic where repairs cannot be performed immediately. Cold patch material shall be applied in one lift, approximately 2 inches thick or greater and shall be flush with adjacent pavement surface. Temporary patch material shall not remain in place for more than seven (7) calendar days.

801.04 – MEASUREMENT AND PAYMENT

The Specifications are amended to include the following:

**Directional Drilled Conduit (Quantity) (Size)** will be measured and paid for at the Contract unit price per horizontal linear feet of directional drill with Quantity and Size of Conduit specified for underground conduit installation of each type furnished, installed, and accepted. Measurement will be along the approximate centerline of the conduit system and shall be measured as horizontal linear feet between the center of each access point. The Contract unit price shall include clearing and grubbing, excavating, conduit(s), backfilling, compacting, disposal of all surplus and unsuitable materials, and site restoration, including restoration of potholes. No measurement will be made of vertical segments, sealing devices, miscellaneous fittings, couplers (where approved), pull lines, sealant, duct plugs, conduit organizers, or seeding and mulching as these will be considered incidental to the conduit installation.

**Modified ECI-1 (Outside Roadway)** will be measured and paid for at the Contract unit price per
horizontal linear feet of trench outside of the roadway. Measurement will be along the approximate centerline of the conduit system and shall be measured as horizontal linear feet between the center of each access point. The Contract unit price shall include excavating, backfilling, compacting, disposal of all surplus and unsuitable materials, and seeding and mulching. Measurement and payment for sidewalk restoration and driveway restoration materials are in accordance with Hydraulic Cement Concrete Sidewalk, Aggregate Base Material, and Asphalt Concrete pay items. No measurement will be made of vertical segments, sealing devices, miscellaneous fittings, pull lines, sealant, duct plugs, or conduit organizers as these will be considered incidental to the 3” Conduit and 4” Conduit Contract items.

**Intercept Existing Conduit** will be measured and paid for at the Contract unit price per each. The Contract price shall include excavating, backfilling, compacting, disposal of all surplus and unsuitable materials, and seeding and mulching. Measurement and payment for concrete restoration and pavement restoration materials are in accordance with Hydraulic Cement Concrete Sidewalk, Aggregate Base Material, and Asphalt Concrete Contract items. No measurement will be made of sealing devices, miscellaneous fittings, sealant, duct plugs, or conduit organizers as these will be considered incidental.

Payment will be made under:

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<th>Pay Item</th>
<th>Pay Unit</th>
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<tr>
<td>Directional Drilled Conduit HDPE (2) (3”)</td>
<td>Linear Foot</td>
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<tr>
<td>Modified ECI-1 (Outside Roadway)</td>
<td>Linear Foot</td>
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<tr>
<td>Intercept Existing Conduit</td>
<td>Each</td>
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SECTION 802 - BOLLARDS

802.01 – DESCRIPTION

This work shall consist of furnishing and installing bollard(s) in accordance with these specifications, the Plans, and as directed by the Engineer.

802.02 – MATERIALS

Bollard shall be galvanized steel, 6” nominal diameter, Schedule 40.

Concrete shall conform to Section 217 of the VDOT Road and Bridge Specifications.

802.03 - PROCEDURES

Excavate foundation area and set base of bollard 4’ (± 1”) below proposed finish grade. If bollard is to be set in concrete, pour concrete to finished grade of adjacent sidewalk or parking lot and dome 1” (± ¼”) concrete around base of bollard to prevent standing water. If bollard is to be set in pervious areas (eg. grass), pour concrete to 3” below finished grade and dome 1” (± ¼”) finished grade materials around base of bollard to prevent standing water.

Fill bollard with concrete and form domed top 1” (± ¼”) over top to prevent water standing. If signpost is proposed in bollard, it shall be set in place prior to filling bollard with concrete.

Bollard shall be set to be 4’ (± 1”) above finished grade and painted with yellow finish.

802.04 – MEASUREMENT AND PAYMENT

Bollards will be measured in units of each and will be paid for at the contract unit price per each. This price shall include excavating footer, furnishing, installing, and painting bollard, and furnishing and installing concrete and foundation stone. The price shall include furnishing and installing expansion joint, if set adjacent to concrete pavement.

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<tr>
<td>Bollard</td>
<td>Each</td>
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SECTION 803 - CPM PROGRESS SCHEDULE

SECTION 108.03 – PROGRESS SCHEDULE of the 2020 VDOT Road and Bridge Specifications is deleted and replaced by this provision.

For definitions of scheduling terms not defined herein and for guidelines on preparing and maintaining the Progress Schedule, refer to the VDOT Post-Award Scheduling Guide.

1. GENERAL REQUIREMENTS

This work shall consist of generating and maintaining a project Progress Schedule to aid the Contractor and the City in planning and executing the Work. The Progress Schedule shall be used by the Contractor, the City, and all involved parties to plan and schedule all work required to complete the project. The Progress Schedule shall also be used by the City to monitor progress of the individual activities required to complete the project; as well as to assess the overall progress of the Work and to evaluate the effects of time-related changes on the project. The Progress Schedule shall consist of a Critical Path Method (CPM) Progress Schedule, Progress Schedule Narrative, and Progress Earnings Schedule submitted in accordance with the requirements of this provision.

The Contractor shall prepare and submit, for the Engineer’s review and acceptance, a Progress Schedule to communicate the Contractor’s intentions and proposed plan to accomplish the Work in accordance with the requirements of the Contract. The Progress Schedule shall depict the sequence in which the Contractor proposes to perform the Work and the dates on which the Contractor contemplates starting and completing all schedule activities required to complete the project. The Contractor shall maintain the Progress Schedule, at a minimum, monthly to ensure that it continues to represent the current status of the project and the Contractor’s current work plan to complete the project.

The Contractor shall attend a Scheduling Conference with the Engineer no later than seven (7) calendar days prior to beginning the Work, with the exception of project start-up activities such as submittals, mobilization, surveying, construction access and signage, erosion and sedimentation controls, etc., as approved by the Engineer. The Scheduling Conference will be held to discuss the Contractor’s overall plan to complete the Work and the detail work plan for the first ninety (90) calendar days of Work. The Scheduling Conference may be held in conjunction with the Pre-Construction Conference or at a separate meeting as mutually agreed to by the Contractor and the Engineer. The Contractor shall discuss his overall plan of operations concerning the Maintenance of Traffic (MOT)/Sequence of Construction or any proposed deviations from the phasing, staging, or sequence of construction as indicated on the Plans or as approved by the Engineer. During the Scheduling Conference key issues and project specific requirements necessary for the development of the Baseline Progress Schedule shall also be discussed. Such key issues shall include as applicable,
but are not limited to key submittals, permits, construction access, right-of-way, environmental, utility, traffic or local events identified in the Contract Documents that may impact traffic; as well as other limitations to the Work or any known constraints or foreseeable issues that may impact the schedule. Such project specific requirements shall include as applicable, but are not limited to scheduling, phasing, sequencing, milestone(s), work to be performed by the City or other previously identified involved parties; or any known or likely constructability issues relative to the Plans and Specifications.

2. OVERVIEW OF THE VARIOUS REQUIRED PROGRESS SCHEDULE SUBMISSIONS

A. PRELIMINARY PROGRESS SCHEDULE

At least two (2) weeks prior to the Scheduling Conference, or as approved by the Engineer, the Contractor shall submit to the Engineer for review and acceptance a Baseline Progress Schedule. The Baseline Progress Schedule submission shall consist of the following:

**Baseline Progress Schedule**

The Baseline Progress Schedule shall represent the Contractor’s initial detailed plan to accomplish the entire scope of Work in accordance with the Contract. The Baseline Progress Schedule shall depict in a time-scaled network logic diagram, the sequence in which the Contractor proposes to perform the work, the project critical path, and the dates on which the Contractor contemplates starting and completing the individual schedule activities required to complete the project. The Baseline Progress Schedule shall also depict the current status of the project and the Contractor’s current plan to complete the remaining work, as of the Baseline Progress Schedule submittal date. The Baseline Progress Schedule shall be developed in *Microsoft Project* format. The Baseline Progress Schedule shall reflect a practicable work plan and logical progress of the Work as indicated in the Contract Documents or as approved by the Engineer. When preparing the schedule, the Contractor shall consider as applicable, all known or specified constraints or restrictions such as: holidays, seasonal, normal weather, traffic or previously identified local events that may impact traffic, utility, railroad, right-of-way, environmental, permits, or other limitations to the Work that will impact the schedule.

**Baseline Progress Schedule Narrative**

The Baseline Progress Schedule Narrative shall describe the Contractor’s overall work plan to complete the entire project as reflected in the Baseline Progress Schedule. The narrative shall describe the Contractor’s proposed sequence of construction, resource utilization plan, working calendar(s), methodology, scheduling assumptions, and considerations made to accommodate potential disruptions in progress of the Work due to normal weather and other applicable known and foreseeable project constraints.

**Baseline Progress Earnings Schedule**

The Baseline Progress Earnings Schedule shall indicate the Contractor’s anticipated cumulative
progress each month as of the Contractor’s progress estimate date as defined in Section 109.08(a) of the 2020 VDOT Road and Bridge Specifications. The anticipated cumulative progress shall be expressed as “Percent Complete” based on the anticipated total earnings to date relative to the Total Contract Value. The Baseline Progress Earnings Schedule shall be based on the Baseline Progress Schedule and shall be prepared on the VDOT Form C-13C in accordance with the VDOT Post Award Scheduling Guide.

Upon acceptance by the Engineer, the accepted Baseline Progress Schedule shall henceforth become the project Schedule of Record (SOR). The SOR shall be defined as the currently accepted Baseline or a subsequent revision in the form of a Revised Progress Schedule, against which all subsequent Progress Schedule Updates and progress will be compared. The SOR shall be used by the Engineer to assess the Contractor’s schedule-based performance on the project.

B. PROGRESS SCHEDULE UPDATE

The Contractor shall submit monthly for the Engineer’s review and acceptance the Contractor’s Progress Schedule Update within five (5) working days after the Contractor’s progress estimate date or as approved by the Engineer. The Progress Schedule Update shall consist of the following:

Progress Schedule Update

The Progress Schedule Update shall depict the current status of the Work and the Contractor’s current plan to complete the remaining work as of the data date.

Progress Schedule Narrative Update

The Progress Schedule Narrative Update shall describe the work performed since the previous update and the Contractor’s current plan for accomplishing the remaining work. It shall also describe any progress deficiencies, schedule slippages, or time-related issues encountered; as well as any actions taken or proposed to avoid or mitigate the effects of the progress deficiencies, schedule slippages, or time-related issues.

Progress Earnings Schedule Update

The Progress Earnings Schedule Update shall depict the current status of the project by percent complete based on the actual total earnings to date relative to the Total Contract Value. The Progress Earnings Schedule Update shall show the actual monthly and cumulative earnings to date as reflected on the Contractor’s payment estimate, any variance in percent complete relative to the SOR, and the projected earnings for the remaining payment periods. The Progress Earnings Schedule Update shall be prepared on the VDOT Form C-13C or as specified herein and in accordance with the VDOT Post-Award Scheduling Guide.

Upon acceptance by the Engineer, the Progress Schedule Update shall replace any previous Progress Schedule Updates as the current update of the SOR; however, it shall not replace the SOR.
The currently accepted Progress Schedule Update shall henceforth become the contemporaneous schedule with which to report the current status of the project, plan the remaining Work, and evaluate the effects of any time-related changes or impacts on the remaining Work.

C. REVISED PROGRESS SCHEDULE

When the current Progress Schedule or work plan deviates significantly from the SOR, the Contractor shall submit to the Engineer for review and acceptance a Revised Progress Schedule to represent the Contractor’s revised plan to complete the remaining work. Deviate significantly will be construed to mean deviations from the SOR resulting from schedule impacts or major changes in the Progress Schedule that alter the project critical path, Contract interim milestone(s), or project completion; or causes a major shift in the Progress Earnings Schedule. A Revised Progress Schedule will be required when:

i. The Engineer approves a Schedule Impact Analysis (SIA) for authorized or unanticipated changes in the Work or conditions that significantly impacts the Progress Schedule, as determined by the Engineer.

ii. The Contractor proposes a different approach to his work plan that significantly impacts the Progress Schedule or the Engineer determines that the current Progress Schedule Update or Contractor’s current work plan deviates significantly from the SOR. Such deviations may include, but are not limited to major changes in the Contractor’s proposed phasing, general sequence, resource plan, means and methods, or durations. The Contractor may revise his Progress Schedule at any time, at his discretion; however, the Engineer will only consider accepting a Revised Progress Schedule submission for major changes that deviate significantly from the SOR.

iii. The Engineer determines that progress of the Work is trending towards unsatisfactory, in accordance with Section VIII (C), and in the opinion of the Engineer, it is apparent that the progress deficiency will not result in an extension of the completion date of the project beyond the Contract time limit and a Recovery Plan is not required to correct the progress deficiency. In such cases, the Engineer will request a meeting with the Contractor to discuss the progress deficiency to determine the appropriate corrective action required.

The Revised Progress Schedule submission shall be based on the currently accepted Progress Schedule Update and shall be prepared and submitted in the form of a Baseline Progress Schedule. However, it shall reflect the current status of the project as of the submittal date, approved changes in the Work, and the proposed plan for completing the remaining work. The Revised Progress Schedule shall be submitted in lieu of a subsequent Progress Schedule Update unless directed otherwise by the Engineer. The Revised Progress Schedule will be reviewed by the Engineer for acceptance in accordance with Section VII. Upon acceptance by the Engineer, the Revised...
Progress Schedule shall henceforth replace the accepted Baseline Progress Schedule or any previously accepted Revised Progress Schedule as the SOR for the remainder of the project.

D. FINAL AS-BUILT PROGRESS SCHEDULE

Within thirty (30) calendar days after final acceptance, the Contractor shall submit to the Engineer his Final As-Built Progress Schedule. The Final As-Built Progress Schedule shall show the actual start and finish dates for each activity in the schedule. The Contractor shall certify in writing that the Final As-Built Progress Schedule accurately reflects the actual start and finish dates for all activities contained in the Progress Schedule. The Final As-Built Progress Schedule shall be submitted in the form of a monthly Progress Schedule Update and shall represent the last Progress Schedule Update submission.

E. ROLLING TWO-WEEK LOOKAHEAD

Within seven (7) calendar days of the Scheduling Conference the Contractor shall provide a two-week look ahead for the Engineer to review. This look ahead shall represent the Contractor’s detailed work plan for the following fourteen (14) calendar days. The two-week look ahead shall depict the detailed construction activities and dates on which the Contractor contemplates starting and completing the individual schedule activities. The two-week look ahead should include a description of work planned for each work day (including weekends/evenings as applicable) for the following fourteen 14 calendar days.

The two-week look ahead shall be submitted to the Engineer each week by close of business on Wednesdays. The Engineer will then review the two-week look ahead and provide any comments to the Contractor by Friday for scheduling of work the following week.

3. SCHEDULE IMPACT ANALYSIS (SIA) FOR CHANGES AND DELAYS

A. CHANGES, DELAYS, AND SCHEDULE IMPACTS

When changes in the Work that will impact the schedule are proposed or authorized by the Engineer, the Contractor shall submit for the Engineer’s review and approval, a Schedule Impact Analysis (SIA) to determine the impact of the change. Also, when the Contractor believes he is entitled to a time extension and/or additional compensation for a time-related impact that is attributable to a cause beyond the control of and without the fault, negligence, or responsibility of the Contractor or those for whom the Contractor is responsible, the Contractor shall submit for the Engineer’s review and approval, a SIA and all available supporting data to substantiate the request for modification of the Contract. The Contractor’s request and SIA shall be submitted in accordance with the following:

i. Impacts Due to Directed or Authorized Changes: When the Engineer issues a written order or authorizes a change in the Work in writing, the Contractor shall submit in writing within seven (7)
calendar days of the Engineer’s written direction or as required by the Engineer, a request for modification of the Contract, if the Contractor believes that additional time and/or compensation is required to perform the Work. Such changes in the Work may include, but are not limited to directed or authorized changes in accordance with the applicable portions of Sections 104.02, 108.05, and 109.05 of the 2020 VDOT Road and Bridge Specifications. The Contractor shall submit along with his request a prospective Schedule Impact Analysis (SIA) to substantiate the request for modification of the Contract in accordance with this provision and the applicable portions of Sections 104.02, 108.05, and 109.05 of the 2020 VDOT Road and Bridge Specifications.

ii. Impacts Due to Unanticipated Changes: When the Contractor discovers or encounters previously unknown or unanticipated changes in the Work or conditions, or a delay event that he believes will impact progress of the Work or completion of the project, the Contractor shall notify the Engineer in writing within two (2) working days of such discovery or encounter. Such changes in the Work or conditions or delay events may include, but are not limited to unusually severe weather, extraordinary or catastrophic weather events, errors or omissions in the Contract Documents; or differing site conditions or utility delays in accordance with the applicable portions of Sections 104.03 and 105.08 of the 2020 VDOT Road and Bridge Specifications. The Contractor shall then gather all available pertinent information and data necessary to determine how such change in the Work or condition will impact progress of the Work or completion of the project. The Contractor and the City shall promptly meet to evaluate the scope and potential impact of such change or condition to allow the Engineer to make a timely decision on how to proceed, as well as to determine how the impact of such change or condition can be avoided or mitigated. The Engineer may direct the Contractor to submit a SIA prior to proceeding with the work affected by such change, condition, or delay, in which case the Contractor shall submit in writing within seven (7) calendar days after receipt of the Engineer’s direction, a request for modification of the Contract and a prospective SIA to substantiate the request for modification of the Contract. Otherwise, the Contractor shall submit in writing a request for modification of the Contract and a contemporaneous SIA to substantiate the request for modification of the Contract. The request for modification of the Contract and SIA shall be submitted within fourteen (14) calendar days of completion of the changed work or work directly impacted by such condition, or the cessation date of the delay event, or as approved by the Engineer.

iii. Unresolved Impacts: When the Contractor believes he is entitled to a time extension and/or additional compensation for an unresolved impact to the Work that is attributable to a cause beyond the control of and without the fault, negligence, or responsibility of the Contractor or those for whom the Contractor is responsible, the Contractor shall submit for the Engineer’s review and approval, a request for modification of the Contract and a retrospective SIA to substantiate the
request for modification of the Contract. Such impacts may involve, but are not limited to changes authorized by either Force Account Work or Unilateral Work Order, or other changes for which the scope of the change or magnitude of the impact could not be determined or mutually agreed to at the time the change was authorized or the delay event or changed condition was encountered.

B. SCHEDULE IMPACT ANALYSIS (SIA)

The SIA submission shall include a SIA schedule and a written SIA statement as well as supporting data and such information necessary for the City to make an adequate and timely evaluation of any time-related request received from the Contractor for modification of the Contract. The SIA submission shall consist of the following:

i. A SIA schedule, as specified herein, which shall depict the schedule impact of the change in the Work or condition or delay event based on the currently accepted Progress Schedule Update, submitted prior to the earlier of the date the change in the Work was authorized or the changed condition or delay event was encountered. If the most recently submitted Progress Schedule Update is unacceptable, then the Engineer will evaluate the request based on the previously accepted Progress Schedule Update. In which case, the Contractor shall update the previously accepted Progress Schedule Update to show the actual progress of the Work to date as of the earlier of the date the change in the Work was authorized or the changed condition or delay event was encountered. The SIA schedule shall:

a. Be based on the “Time Impact Analysis (TIA)” or “Contemporaneous Schedule Analysis” method as determined by the Engineer, to determine the status of the currently accepted Progress Schedule Update before and after the change in the Work or condition or delay event.

b. Show a fragnet (fragmentary network of added or changed activities) representing the added work, changed work or condition, or delay event(s). The fragnet activities shall be logically linked to the affected activities to show the direct impact on the work.

c. Show the current status of the completed and on-going activities as of the date the change in the Work was authorized or the changed condition was encountered or the delay event started.

d. Depict the schedule impact by showing a comparison between the impacted Progress Schedule Update and the most recently accepted Progress Schedule Update with a data date closest to and prior to the earlier of the date the change in the Work was authorized or the changed condition or delay event was encountered.

e. Depict the overall impact on the project critical path, Contract interim milestone(s), other significant dates, and the Contract fixed completion date, as applicable.

ii. A written SIA statement to:
a. Describe the type, cause, and scope of the added work, changed work or condition, or delay event.

b. Provide sequence and timing of events and/or actions by all involved parties relating to the change or delay.

c. Describe the particular operations affected as well as identify by Activity ID and Activity Name the activities that are directly impacted.

d. Describe the impact on the critical path, total float, Contract interim milestone(s), other significant dates, or the Contract fixed completion date, as applicable.

e. Include a comparative analysis report relative to the currently accepted Progress Schedule Update to identify all changes made to the impacted Progress Schedule.

f. Identify any actions taken and/or needed to avoid or mitigate the delay or the effects of the delay.

Approval or rejection of the SIA by Engineer shall be made within ten (10) business days after receipt of the SIA, unless subsequent meetings and negotiations are necessary, as determined by the Engineer. Upon approval by the Engineer, the Contractor shall incorporate the SIA into the Progress Schedule and shall submit the impacted Progress Schedule as a Progress Schedule Update or Revised Progress Schedule as directed by the Engineer. If appropriate, the approved SIA shall be used to substantiate any request for a time extension or time-related damages or additional compensations, in accordance with the applicable portions of Sections 104.02, 104.03, 105.08, 108.04, and 109.05 of the 2020 VDOT Road and Bridge Specifications.

4. DETAILED REQUIREMENTS FOR PROGRESS SCHEDULE SUBMISSIONS

A. PROGRESS SCHEDULE

The Progress Schedule shall conform to the following requirements:

Software Compatibility Requirements

The Contractor shall prepare and maintain the Progress Schedule using Microsoft Project. Compatible shall mean that the Contractor-provided electronic file versions of the schedule can be imported into the City’s scheduling software system with no modifications, preparation or adjustments. At the Contractor’s request, secured access via the internet may be granted to allow the Contractor to develop and maintain his Progress Schedule in the City’s scheduling software system.

Level of Detail

The Contractor shall develop the Progress Schedule to an appropriate level of detail that allows for the formation of a reasonable critical path. The Progress Schedule shall show as applicable,
Contract milestones and other key milestones for significant project events. The Progress Schedule shall also show, as applicable, administrative, procurement, MOT, work to be performed by other involved parties, discrete work activities to indicate the type of operation and location of the work, and other necessary time-based tasks required for completion of the project. The Work shall be subdivided as practical, to such a level that the activity durations for on-site work excluding, activities whose durations are specified elsewhere in the Contract, are twenty (20) workdays or less. Longer durations may be allowed, as approved by the Engineer, for activities that typically span long periods of time such as fabrication and delivery of materials, administrative, MOT, or other such level of effort activities.

**Network Logic**

The Progress Schedule network logic shall be based on the Precedence Diagram Method (PDM) and shall show the order and inter-dependence of the activities and the sequence in which the Contractor proposes to accomplish the Work. The Contractor shall apply the Critical Path Method (CPM) of network calculation to generate the Progress Schedule. The project critical path shall be based on the “Longest Path.” The Progress Schedule network logic shall be developed in accordance with the detail requirements defined in the VDOT Post-award Scheduling Guide.

**Schedule Constraints**

All Contract milestone activities shall be constrained, as applicable, with a “Start On or After” (Early Start) date or “Finish On or Before” (Late Finish) date equal to the “Start No Earlier Than” or “Must Finish By” date specified in the Contract, except as specified below. The Contractor’s use of schedule constraints with the exception of the specific requirements defined below is not allowed, unless approved by the Engineer. The use of schedule constraints such as “Start On” or “Finish On” for the purpose of manipulating float or the use of schedule constraints that violate network logic such “Mandatory Start” or “Mandatory Finish” will not be allowed. When a schedule constraint is used, other than the schedule constraints specified herein, the Contractor shall provide explanation for the use of such constraint in the Progress Schedule or Progress Schedule Narrative.

**Data Date**

The data date is defined as the current status date of the Progress Schedule, which defines the start date for the scheduled remaining Work. All Progress Schedule submissions shall be calculated using an appropriate data date to indicate the status of the project at the time the Progress Schedule is submitted.

i. For the Preliminary, Baseline, or subsequent Revised Progress Schedule submission, the data date shall be no more than five (5) business days prior to the submittal date.

ii. For the monthly Progress Schedule Update submissions the data date shall be the Contractor’s
monthly progress estimate date as defined in Section 109.08(a) of the 2020 VDOT Road and Bridge Specifications.

**Total Float**

This section is intended to apply only to considerations of Contract time extension requests relative to available total float. Considerations for other time-related impacts, if any, are covered in other Sections of the Specifications. Any request for a Contract time extension will be evaluated, in accordance with Section 108.04, based on the critical path and available total float. Total float is defined as the amount of time, typically expressed in days (number of workdays or calendar days depending on the assigned calendar), that an activity can be delayed without extending the completion date of a related Contract interim milestone or the project, as applicable. Except as specified herein, total float shall be calculated, as applicable, relative to a constrained Contract interim milestone date or the Contract fixed completion date specified in the Contract or a subsequent Work Order.

With the exception of A+B based Contracts, any float available in the Progress Schedule, at any time, shall be considered project float and is not for the exclusive use or benefit of either the City or the Contractor. It shall be understood by the Contractor and the City that float is a shared commodity and either party has the right to full use of any available float. Until such time that all available float is depleted, the project float shall be used responsibly in the best interest of the project and in a manner that best serves the timely completion of the Work by either a specified Contract interim milestone or the Contract fixed completion date, as applicable.

For A+B based Contracts for which the Contractor bids the Contract time and/or Contract interim milestone(s), any float on a critical activity or activities on the critical path shall belong to the Contractor and any float on non-critical activities or activities not on the critical path shall belong to the project and shall be considered available project float for use by either the City or the Contractor for the benefit of the project.

The Contractor shall not modify the Progress Schedule at any time for the purpose of manipulating float. Negative float conditions will not be allowed in the Preliminary, Baseline, or Revised Progress Schedule.

**Progress Schedule Update**

The Progress Schedule Update shall reflect the actual status of the Work and the current plan to complete the remaining work as of the current data date. It shall show the actual start/finish dates for each completed activity and the actual start date, remaining duration, and progress (percent complete) of each on-going activity. The Progress Schedule Update shall allow for an accurate determination of progress of completed and ongoing work based on total actual cost (earnings) to date; as well as an accurate projection of the anticipated monthly earnings for the remaining work based on remaining
cost. The Progress Schedule Update shall be based on the most recently accepted Progress Schedule and shall be prepared in accordance with the detail requirements defined in the VDOT Post-award Scheduling Guide.

B. PROGRESS SCHEDULE NARRATIVE

A Baseline Progress Schedule Narrative shall be submitted with the Baseline Progress Schedule submission and a Progress Schedule Update Narrative shall be submitted with the Progress Schedule Update submission. The Progress Schedule Narrative shall be prepared in accordance with the following:

i. Baseline Progress Schedule Narrative:

The Baseline Progress Schedule Narrative shall include the following written information:

a. The Contractor’s overall plan describing:
   1) The proposed overall sequence of construction, including where the work will begin and how the work will progress;
   2) The methodology, scheduling assumptions, and general procedures for completing each major feature of work;
   3) A list of the major resources (number and type of crews and equipment) required to complete the project as scheduled. For early completion schedules (projects with an early completion interim milestone provision or projects with scheduled completion dates earlier than the Contract specified date by thirty (30) calendar days or more), the Contractor shall also provide a written resource plan for the major operations to demonstrate the Contractor’s ability and commitment to provide resources at the level required to complete the work within the timeframes shown in the Progress Schedule;
   4) Anticipated daily production rates for each major operation.

b. A description of the project critical path.

c. A listing of the major milestone dates, including as applicable, Contract interim milestone(s), major traffic switches, start/finish milestones for each phase or stage of work, or related work to be performed by the City or other involved parties.

d. A log identifying the schedule constraints used in the Progress Schedule and reason for using each constraint.

e. A description of the calendar(s) used in the Progress Schedule to indicate the Calendar ID, number of work days per week, number of shifts per day, and number of hours per day as well as the anticipated number of non-working days per month for each calendar with
considerations, as applicable, for holidays, normal weather conditions; as well as for seasonal or other known or specified constraints and restrictions (i.e. traffic, local events, environmental, permits, utility, etc.)

f. A description of any known problems or anticipated issues that may impact the schedule, and any actions taken, proposed, or needed to correct the problems.

ii. Progress Schedule Update Narrative:
The Progress Schedule Update Narrative shall include the following written information:

a. A description of the current status of the project in terms of the current actual percent complete by total earnings relative to the SOR planned percent complete; as well as the scheduled completion dates of the interim milestone(s) and project completion.

b. A description of any deviations from scheduled performance in terms of the scheduled completion dates of the interim milestone(s) and project completion since the previous schedule submission, including a statement explaining why any of the schedule milestone date(s) is forecast to occur after the specified date(s).

c. A description of the work performed since the previous Progress Schedule submission and any deviations from the work scheduled.

d. A description of major changes in the Contractor’s work plan in terms of sequence of construction, shifts, manpower, equipment, or materials.

e. A description of any deviations in project critical path since the previous Progress Schedule submission.

f. A description of problems encountered or anticipated since the previous Progress Schedule submission, including an explanation of any corrective actions taken or required to be taken.

g. A description of work planned for the next update period and actions to be taken by the City or other involved third parties.

5. REPORTING AND SUBMITTAL REQUIREMENTS FOR PROGRESS SCHEDULE SUBMISSIONS

Unless otherwise directed by the Engineer, the Contractor shall submit for each Progress Schedule submission the following submittal items. The Progress Schedule submittals shall include:

i. A transmittal letter to the Engineer, identifying the date of submittal and which Progress Schedule is being submitted for review.

ii. One (1) set of electronic file copies by email of the following:

a. A working file of the Progress Schedule in Microsoft Project file format.

b. Electronic “PDF” copy of the Progress Schedule Narrative.
d. A working file of the Progress Earnings Schedule (VDOT Form C-13CPM).

6. FAILURE TO SUBMIT PROGRESS SCHEDULES

The Engineer will take necessary actions in accordance with the following for failure on the part of the Contractor to submit the required Progress Schedules:

i. If the Contractor fails to submit his complete Preliminary Progress Schedule at least two (2) weeks prior to the Scheduling Conference, the Contractor shall not commence Work, with the exception of project start-up activities such as submittals, mobilization, surveying, construction access and signage, erosion and sedimentation controls, etc., until after seven (7) calendar days from the date the Contractor submits his complete Preliminary Progress Schedule, unless otherwise approved in writing by the Engineer.

ii. If the Contractor fails to submit his complete Baseline Progress Schedule within thirty (30) calendar days after the NTP date or as approved by the Engineer, the Engineer will delay approval of the Contractor’s next monthly progress estimate following the due date of the Baseline Progress Schedule until such time as the Contractor has satisfied the submittal requirements.

iii. If the Progress Schedule submission is deemed unacceptable by the Engineer; and the Contractor fails to submit an acceptable Progress Schedule within fourteen (14) calendar days after the Engineer’s request, the Engineer will delay approval of the Contractor’s next monthly progress estimate following the due date of the Progress Schedule until such time as the Contractor has satisfied the submittal requirements.

iv. If the Contractor fails to provide a Progress Schedule Update or if a Revised Progress Schedule is required as specified herein and the Contractor fails to provide such a Progress Schedule, the Engineer will delay approval of the Contractor’s next monthly progress estimate following the due date of the Progress Schedule until such time as the Contractor has satisfied the submittal requirements.

v. If the Contractor fails to provide an acceptable Final As-built Progress Schedule as specified, the Engineer will delay approval for payment of the Contractor’s final progress estimate until such time as the Contractor has satisfied the submittal requirements.

Please note: Delays resulting from the Contractor’s failure to provide the Progress Schedule in accordance with the requirements set forth herein will not be considered just cause for extension of the Contract time limit or for additional compensation.
7. REVIEW AND ACCEPTANCE

The Engineer will review all Progress Schedule submissions within fourteen (14) calendar days of receipt of the Contractor’s complete submittal, unless subsequent review meetings are necessary, as determined by the Engineer. The Engineer’s review for acceptance will not commence until all required submittal items and schedule information as defined herein are provided. Acceptance by the Engineer will be based only on completeness and conformance with the requirements of the Contract.

If the Contractor’s Progress Schedule submission is deemed to be acceptable, the Engineer will respond with a written notice of acceptance, which may include comments or minor concerns on the submission and/or a request for clarification or justification. When the Engineer’s response include any comments, concerns, or request for clarification or justification, the Contractor shall respond accordingly within seven (7) calendar days of receipt of the Engineer’s response. The Contractor’s response may include a resubmission of the Progress Schedule to address the Engineer’s comments or concerns or provide clarification or justification accordingly.

If the Contractor’s Progress Schedule submission is deemed to be unacceptable, the Engineer will issue a written notification of non-conformance, which will include a request for resubmission and comments describing the deficiencies prompting the Engineer’s decision. At the Engineer’s discretion, the Contractor may be required to attend a schedule review meeting to discuss the issues prompting the Engineer’s decision or to facilitate review and acceptance of the Progress Schedule submission. When the Progress Schedule submission is deemed by the Engineer to be unacceptable, the Contractor shall revise and re-submit the Progress Schedule submission accordingly, within seven (7) calendar days of receipt of the Engineer’s response.

Review and acceptance by the Engineer will not constitute a waiver of any Contract requirements and will in no way assign responsibilities of the work plan, scheduling assumptions, and validity of the schedule to the City. Failure of the Contractor to include in the Progress Schedule any element of work required by the Contract for timely completion of the project will not excuse the Contractor from completing the Work within the Contract specified interim milestone(s) or the Contract time limit, as applicable.

8. MONITORING THE WORK AND ASSESSING PROGRESS

A. MONITORING THE WORK

The Engineer will monitor the Work regularly to identify deviations from the Contractor’s scheduled performance relative to the SOR. The Contractor shall notify the Engineer at least two (2) working days in advance of any changes in the Contractor’s planned operations or critical stage work requiring City oversight or inspection. The Contractor shall attend a monthly progress schedule meeting with the Engineer on a day agreed to by the Contractor and the Engineer. The Contractor shall
furnish his detailed 30-day look-ahead schedule at the progress meeting and shall be prepared to
discuss the current status of the Work and planned operations for the following thirty (30) calendar
days. The 30-day look-ahead schedule shall be based on the Contractor’s current monthly Progress
Schedule Update.

B. PROGRESS EVALUATION

Progress will be evaluated by the Engineer at the time of the monthly progress estimate relative to
the SOR. The Contractor’s actual progress will be considered unsatisfactory if any of the following
conditions occurs:

i. The actual total earnings to date percentage for work completed, based on the Contractor’s
progress payment estimate, falls behind the SOR planned cumulative earnings percentage by more
than ten (10) percentage points. If the Progress Earnings Schedule is based on a cost-loaded
Progress Schedule, then the unsatisfactory progress threshold will be based on falling behind the
SOR planned cumulative late date’s earnings percentage. Payments for Stored Materials, Materials
on Hand, or Adjustments (asphalt, fuel, etc.) shall not be included in the actual progress earnings.

ii. The calculated completion date of a Contract interim milestone is later than the specified
completion date by more than fourteen (14) calendar days.

iii. The calculated project completion date is later than the Contract fixed completion date by more
than thirty (30) calendar days.

C. PROGRESS DEFICIENCY AND SCHEDULE SLIPPAGE

When the Contractor’s actual progress is trending toward unsatisfactory status, the Engineer will
request a meeting with the Contractor to discuss any actions taken or required by the Contractor to
reverse this trend and to correct the progress deficiency or schedule slippage.

When the Contractor’s actual progress is deemed to be unsatisfactory as defined by any of the
conditions listed under Progress Evaluation of this provision, the Engineer will issue a written notic e
of unsatisfactory performance to advise the Contractor that five (5) percent retainage of the monthly
progress estimate is being withheld and will continue to be withheld as described in Section 109.08(c),
for each month the Contractor’s actual progress is determined to be unsatisfactory. When the
Contractor fails to respond with good faith efforts as described herein to restore satisfactory progress,
the Engineer will issue a notice to indicate that he may recommend the Contractor be temporarily
disqualified from bidding on Contracts with the City as described in Section 102.08 of the 2020 VDOT
Road and Bridge Specifications, if progress remains unsatisfactory at the time of preparation of the
next monthly progress estimate following the Engineer’s notice. Prior to recommendation for removal
from the list of pre-qualified bidders, the Engineer will allow the Contractor fourteen (14) calendar
days from the date of the unsatisfactory performance notice to respond. Such “good faith” efforts shall
be provided in sufficient detail to allow the Engineer to fully evaluate the Contractor’s plans for recovery. As an example of good faith efforts, the Contractor may submit to the Engineer, a proposed recovery plan in the form of a Progress Schedule Update and a written statement to describe the Contractor’s proposed actions and timeframe to correct the progress deficiency or schedule slippage. The Contractor may also submit to the Engineer a written explanation and supporting documentation to establish that such delinquency was attributable to conditions beyond his control. Any schedule adjustments resulting from a recovery plan will be reviewed in accordance with Section VII, but the modified Progress Schedule Update shall not replace the current SOR.

When the Engineer determines the Contractor’s progress is again satisfactory the five (5) percent retainage previously withheld will be released to the Contractor in accordance with the provisions of Section 109.08 (c) of the Specifications.

If the Contractor is temporarily disqualified from bidding on Contracts with the City, the Contractor will not be reinstated until either the Engineer deems that his progress has improved to the extent that the Work can be completed within the Contract time limit or the project has received final acceptance in accordance with the provisions of Section 108.09 of the 2020 VDOT Road and Bridge Specifications.

9. MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for CPM project scheduling. CPM project scheduling shall be considered incidental to the cost of the contract.