

## SECTION 11010

### ROOF ANCHORS

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION:

- A. Work of this section includes the design, supply and installation of anchors for window washing/suspended maintenance equipment.
- B. Related work specified elsewhere:
  - 1. Division 3 - Concrete
  - 2. Division 5 - Metals
  - 3. Division 7 - Thermal And Moisture Protection

##### 1.02 REFERENCES:

- A. AISC publication "Load and Resistance Factor Design Specification for Structural Steel Buildings".
- B. AISI publication "Specification for Design of Cold-Formed Steel Structural Members (1986 & 1989 Addendum)".
- C. Aluminum Association publication No.30 "Specification for Aluminum Structures" and AWS D1.2-90 Structural Welding Code - Aluminum.
- D. AWS D1.1 Structural Welding Code - Steel.

##### 1.03 DESIGN REQUIREMENTS:

- A. Design window washing/suspended maintenance system to suit building and in accordance with plans, specifications, standards, and regulations/codes contained in section 1.4 and 1.8.
- B. Locate safety and tie-back anchors to suit suspension equipment which will be used on the building with respect to items such as reach, rigging, spacing, roof edge condition and similar items.
- C. Design all anchor components to provide adequate attachment to the building and suited to current window washing/suspended maintenance practices. Ensure compatibility with industry standard equipment.
- D. Ensure all anchor components conform to proper engineering principles and have been designed by a Professional Engineer qualified in the design of window washing/suspended maintenance equipment, its application and safety requirements.
- E. Design system fall arrest safety anchors to comply with the following structural requirements:
  - 1. Designed to resist a 5,000 lb. (22.2 kN) horizontal load in any direction without detachment or fracture occurring. This load is considered to be an ultimate peak dynamic load and yielding of the anchor and structure in the event of a fall is not precluded. To avoid deformation under normal usage, anchors are to be generally designed to resist a 1,000 lb. (4.5 kN) static horizontal load in any direction without yielding.

#### **1.04 SHOP DRAWINGS AND ENGINEERING CERTIFICATION**

- A. Submit shop drawings showing complete layout and configuration of complete window washing/suspended maintenance system, including all components and accessories. Clearly indicate design and fabrication details, window "drops", hardware, and installation details.
- B. Shop drawings to include installation and rigging instructions and all necessary Restrictive and Non- Restrictive Working Usage Notes and General Safety Notes.
- C. Shop drawings complete with calculations to be reviewed by and bearstamp of a professional engineer.

#### **1.05 QUALIFICATIONS**

- A. Manufacturer: Work of this Section to be executed by manufacturer specializing in the design, fabrication and installation of window washing/suspended maintenance systems having a minimum of 5 years documented experience
- B. Loading and safety assurance: Work of thisSection to meet the requirements of governing codes and jurisdiction and to comply with properly engineered loading and safety criteria for the intended use.
- C. Insurance: Manufacturer to carry specific liability insurance (products and completed operations) in the amount of \$2,000,000.00 to protect against product/system failure.
- D. Welding to be executed by welders qualified to work in the State in which the project is being completed.

#### **1.06 REGULATORY REQUIREMENTS**

- A. Comply with the following OSHA regulations:
  - 1. 1910, Subpart D (Walking and Working Surfaces).
  - 2. Appendix C to 1910 (Personal Fall Arrest Systems).
  - 3. "OSHA Ruling on Window Cleaning by Bosun's Chair" Memorandum toRegional Administrators from P. K. Clark, Director, Directorate of Compliance Program
  - 4. 1910, Subpart F (Powered Platforms).

#### **1.07 MAINTENANCE DATA**

- A. Submit 1 copy of system Equipment Manual & Inspection Log Book, with "Initial Inspection - Certification for Use" and "Inspection Sign-Off" forms completed.
- B. Submit 2 copies of a reduced plastic laminated as-built shop drawing showing equipment locations and details. This drawing is to be posted near exits onto the roof.

### **PART 2 - PRODUCTS**

#### **2.01 MANUFACTURER**

- A. This specification is generally based on systems currently being manufactured by PRO-BEL, Telephone: (905) 427-0616, Fax: 905-427-2545, Toll free: 1-800-461-0575.
- B. Other manufactured products meeting this specification may be substituted provided that manufacturers show proof of product insurance.Equipment details to be approved by The

Engineer.Companies, such as miscellaneous metal fabricators, who are not normally engaged in the design and manufacture of window washing/suspended maintenance equipment are not permitted to bid.

## **2.02 EQUIPMENT**

- A. Through bolted roof anchors as manufactured by, but not limited to:
  - 1. PRO-BEL Model EPB-73S

## **2.03 MATERIALS**

- A. U-bar, anchor bolts Type 304 stainless steel with yield strength of 42 Ksi (290 MPa). U-bar to be not less than 3/4" (19 mm) diameter material with 1-1/2" (38 mm) eye opening.
- B. Hollow steel section (HSS) piers: galvanized steel as above with yield strength of 50 Ksi (345 MPa), [with] [without] urethane foam insulation.Wall thickness to suit application.
- C. Base plate and all other sections: galvanized mild steel as above with yield strength of 43 Ksi (297 MPa). Thickness and securement to suit application.
- D. Seamless spun aluminum flashing (for steel pier anchors): Type 6061-T6 alloy to ASTM B221 with deck flange flashed in to NRCA recommendations.Seal top of aluminum flashing with conformable mastic tape and torch applied heat-shrink rubber membrane.
- E. Bolts, nuts and washers: ASTM A36, galvanized to ASTM A123.

## **2.04 FABRICATION**

- A. General:
  - 1. Fabricate work true to dimension, square, plumb, level and free from distortion or defects detrimental to appearance and performance.
  - 2. Grind off surplus welding material and ensure exposed internal corners have smooth lines.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Examine surfaces and areas upon which the work of this Section depends. Report to the Contractor in writing, defects of work prepared by other trades and other unsatisfactory site conditions which would cause defective installation of products, or cause latent defects in workmanship and function.
- B. Verify site dimensions.
- C. Commencement of work will imply acceptance of prepared work.

### **3.02 INSTALLATION**

- A. Install equipment in accordance with approved shop drawings and manufacturer's recommendations.
- B. Co-ordinate installation with work of related trades.
- C. Install all work true, level, tightly fitted and flush with adjacent surfaces as required.

- D. Deform threads of tail end of anchor studs after nuts have been tightened to prevent accidental removal or vandalism.
- E. Manufacturer to assist and/or supervise installation of window washing/suspended maintenance equipment installed by others.
- F. Structural steel to receive rooftop anchors equipped with 4" (100 mm) diameter HSS pier to have minimum 5" (127 mm) wide bearing surface to ensure 100% weld.

### **3.03 FINAL ADJUSTING AND INSPECTION**

- A. Adjust and leave equipment in proper working order.
- B. Complete "Initial Inspection - Certification for Use" form included in Equipment Manual & Inspection Log Book.

### **3.04 TESTING**

- A. All anchorage systems relying upon chemical adhesive fasteners to be 100% tested on site using load cell test apparatus in accordance with manufacturer's recommendations.
- B. Load cell test to apply minimum 5,000 lb. (22.2 kN) load without detachment or fracture occurring.

**END OF SECTION**

## SECTION 11155

### MECHANICAL PARKING METERS

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION:

- A. This section specifies mechanical parking meters, meter collection cart, collection boxes and associated features.
- B. Related Work Specified Elsewhere:
  - 1. Galvanized steel parking meter post: Section 05500.
- C. Definitions:
  - 1. Short Term spaces: Metered spaces for paid parking up to seven hours from 8:30 AM to 2:00 AM.
  - 2. Kiss and Ride spaces: Metered spaces for paid parking up to seven hours from 8:30 AM to 3:30 PM and from 7:00 PM to 2:00 AM. From 5:00 AM until 8:30 AM and from 3:30 PM to 7:00 PM these spaces are designated NO PARKING, intended to be used only for driver-attended drop-off and pick-up of Metro patrons. Long Term spaces: Metered spaces for paid parking up to 12 hours from 8:30 AM to 2:00 AM.
- D. WMATA Credit: If lock specified for the security vault doors cannot be installed due to unavailability from the lock manufacturer, a WMATA-determined credit or deduction for purchase and installation of the specified lock by WMATA will be applied and used in Bid evaluations

##### 1.02 QUALITY ASSURANCE:

- A. Codes, Regulations, Reference Standards and Specifications:
  - 1. Codes and regulations of the jurisdictional authorities.
- B. Qualifications of the Manufacturer: Provide products of an established manufacturer of mechanical parking meters for at least the last 10 years.

##### 1.03 SUBMITTALS:

- A. Submit the following for approval in accordance with the General Requirements and with the additional requirements as specified for each:
  - 1. Shop Drawings: Details and parts list of specified products. Include manufacturer's installation, operating and maintenance instructions.
  - 2. Samples:
    - a. One meter, meter collection cart and collection box.
    - b. One of each accessory material or tool used for the work or for servicing the meters.
    - c. After approval, samples may be installed in the work.
  - 3. Certification: Document that the parking meters and support equipment are current production models, which the manufacturer has delivered to other purchasers in substantial quantities, and which are in current operational use.

##### 1.04 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Follow manufacturer's instructions to protect mechanisms and finishes from damage.

- B. Deliver spare meters, meter collection carts, collection boxes and other material as directed by the Engineer.

## **PART 2 - PRODUCTS**

### **2.01 GENERAL:**

- A. Provide products and components that are new and unused.
- B. Provide parking meters and components of design and manufacture that have withstood five or more years of dependable on-street performance.
- C. Each meter consists of one mechanism with timer, enclosed in a zinc-alloy upper housing, and one coin canister, enclosed in a cast-iron security vault housing. Duplex meters include two each of the above plus one yoke.

### **2.02 MECHANISM:**

- A. Operation: After deposit of a proper coin and fully turning the operating handle, the time indicator displays the increment of time purchased. Existing time may be increased by deposit of additional proper coins until reaching the maximum time limit of the meter. Total amount of time purchased and time still available are shown after the deposit of each coin. Whenever the operating handle is turned from home position, the Violation Flag is displayed until the rotation cycle is completed.
- B. Mechanism Assembly: The meter operating mechanism is constructed as a completely assembled unit totally separate from the mechanism housing, removable from or replaced in the housing as a whole unit, for inspection or repair, without the use of special tools. The meter mechanism is to be a self-aligning, drop-in unit, that does not require locking studs, pins or screws to secure it into the housing.
- C. Coin Slot: Coin slot is to be on front of the meter next to operating handle and positioned so that coins enter the slot on edge vertically and perpendicular to face of the meter. Coin slot is to be either stainless steel or zinc alloy, sized to specific coin denomination. Meter mechanisms are to automatically close the coin slot entrance during turning of operating handle or in event of a jam, thereby preventing the insertion of additional coins until cleared. The mechanism is to be easily adjusted to maintain proper tolerance between the time winding component and the coin carrier.
- D. Washer Detector: Equip meter with a washer-sensing device to detect improper coinage or washers, passing them through without adding time.
- E. Flags: Mechanism is to have two-flags: TIME EXPIRED and VIOLATION.

### **2.03 TIMER:**

- A. Construction: Use high quality workmanship, with gears and pinions free from burrs, shock-resistant, and with gears, pinions and other components made of non-corrosive materials. Protect timer from dust, moisture and impact by using timer cover made of UV-resistant transparent thermoplastic material, so as to permit viewing of the time without requiring removal of the cover.
- B. Operation: Mechanism clock and timer is to function correctly at temperatures from minus 30F to plus 130F, with an error factor of exact run-out to plus three minutes per hour maximum.

- C. Adjustment: The front balance wheel pivot, or adjustment stud, is to be threaded so it may be used to adjust balance-wheel end play. The back, exposed end, of the arbor shaft is to be machined so that a timer key may be used to either place time on or remove it from the meter mechanism, as well as for use in winding the timer when servicing.

#### **2.04 MECHANISM HOUSING (UPPER HOUSING):**

- A. Construction: Rugged, weather-resistant zinc-alloy case constructed to resist tampering and abuse. Cap portion is to have a clear viewing window made of high-impact-resistant and UV-resistant polycarbonate material.
  - 1. Mechanism housing is to have capability of being set to at least two different housing positions by simple means from within the mechanism housing.
  - 2. Mechanism housing is to be fully interchangeable from one meter to another, or from single to duplex meter units; and vice-versa.
- B. Lock: Access to the mechanism is to be through a tumbler lock and key, but not allow access to the coin compartment
- C. Finish: Chip-and-scratch-resistant, UV-resistant, oven-cured polyester powder coating, with minimum dry film thickness of 2.5 to 3.5 mils. Color as determined by the Engineer.

#### **2.05 SECURITY VAULT (LOWER HOUSING):**

- A. Construction: One-piece cast-iron casting, rugged, weather-resistant, corrosion-resistant, and of such thickness as to resist tampering and abuse.
  - 1. Vault Door is to have same construction as the security vault. Vault door and door opening are to be machined to a tolerance of less than 1/32 inch. Door is to be hinged to the vault compartment using steel pins. Design is to prevent drilling out these steel pins to gain access to the coin compartment using a common hand-held drill and bits. Door locking mechanism is to have a latch arrangement to prevent prying open the door.
  - 2. Bottom of security vault is to fit into a nominal two-inch OD Schedule 40 (standard weight) galvanized-steel pipe, and to fasten securely to the pipe (post) with a self-adjusting three-piece wedge assembly designed so that the unit can only be removed from inside the security vault.
  - 3. Security vaults and vault doors are to be fully interchangeable from one meter to another.
- B. Lock: National KeSet High-Security Lock (part number N42002), matching the series and key combinations reserved for WMATA. Other locks are not to be furnished. See Article 1.1 paragraph entitled WMATA Credit.
- C. Keys: Keys for the lock are to be precision cut from materials ensuring long life, without damage to the lock or tumblers. Key blanks are not to be available from locksmiths. Key delivery is to be via registered letter only to the WMATA recipient designated by the Engineer.
- D. Finish: Chip-and-scratch-resistant, UV-resistant, oven-cured polyester powder coating, with minimum dry film thickness of 2.5 to 3.5 mils. Gray color as determined by the Engineer.

#### **2.06 COIN CANISTER:**

- A. Construction: Sealed box of largest-capacity-available; dent-resistant and of lightweight construction; made of corrosion-resistant metals, high-impact ABS plastic material or both. However, these containers are to be strong enough to resist entry with normal hand tools and breakage from dropping.

- B. Operation: When coin canister is removed from a meter for collection purposes, it can unlock only when inserted into a special receiving device (revenue-collection-head assembly) having an embedded key, which thereby allows coins to drop directly into the collection box mounted on a meter collection cart as specified below. The coin canister prevents coins from being removed by means of inverting or shaking the canister unless it is placed in the revenue-collection-head assembly on the collection box.
- C. Lock: Lock and keying for coin canisters are to be different from those of the mechanism housing and security vault, but are to be the same for all coin canisters and reserved for the exclusive use of WMATA.

**2.07 YOKE:**

- A. Construction: Heavy-duty cast-iron unit designed to receive two single meters as a duplex installation on a single post. Make yokes fully compatible with the parking meters. Bottom of yoke is to fit into a nominal two-inch OD Schedule 40 (standard weight) galvanized-steel pipe, and to fasten securely to the pipe (post) with a self-adjusting three-piece wedge assembly designed so that the unit can only be removed from the inside. There is to be no exposed mounting nut on the yoke or meters when assembled on the post.
- B. Finish: Chip-and-scratch-resistant, UV-resistant, oven-cured polyester powder coating, with minimum dry film thickness of 2.5 to 3.5 mils. Gray color as determined by the Engineer.
- C. Quantity: Provide yokes only where duplex meters are specifically shown.

**2.08 METER COLLECTION CART, COLLECTION BOX AND ACCESSORIES:**

- A. Meter Collection Cart is a wheeled cart designed to securely hold a collection box.
- B. Collection Box is a secure box having lock, hasp and security hinges on its access door. A revenue-collection-head assembly is on the lid of the collection box for receiving, unlocking and dumping contents from the parking meter coin canisters. Collection boxes are to be of rugged enough construction as to resist entry with normal hand tools.
- C. Revenue-Collection-Head Assembly: This is to be fully compatible with the coin canister, and includes an embedded key to unlock the sealed coin canister. The sealed coin canister thereby opens inside the revenue-collection-head assembly causing the canister's contents to empty directly into the collection box.
  - 1. Make embedded key for coin canisters different from keys for the mechanism housing and security vault, but able to open all coin canisters, and reserved for the exclusive use of WMATA.
  - 2. Head assembly is to be so constructed as to prevent unauthorized removal of coins from the collection box.
- D. Finish: Baked enamel or polyester powder coating. Color as determined by the Engineer.
- E. Quantity:
  - 1. Meter Collection Cart: One.
  - 2. Collection boxes: One for each isolated facility where meters are provided.

**2.09 DURATION, RATES, COINAGE AND RATE PLATE:**

- A. Short Term and Kiss-and-Ride Spaces: Make meters at these spaces capable of the following duration, rates and coinage, and equipped with rate plates:
  - 1. Duration: Seven hours maximum time on meter.
  - 2. Rate: \$0.25 per hour to the maximum time on dial.



3. Coinage: Quarters only.
4. Short Term rate plate: Install in each meter an aluminum rate plate which lists duration, rate, coinage and periods of operation; reading as follows:

MAXIMUM SEVEN-HOUR DURATION PARKING  
EFFECTIVE FROM 8:30 A.M. TO 2:00 A.M.  
EXCEPT SATURDAYS, SUNDAYS AND HOLIDAYS  
\$0.25 PER HOUR TO MAXIMUM TIME ON DIAL  
USE QUARTERS ONLY

5. Kiss-and-Ride rate plate: Install in each meter an aluminum rate plate which lists duration, rate, coinage and periods of operation; reading as follows:

PARKING FROM 8:30 A.M. TO 3:30 P.M.  
AND 7:00 P.M. TO 2:00 A.M. ONLY  
EXCEPT SATURDAYS, SUNDAYS AND HOLIDAYS  
\$0.25 PER HOUR TO MAXIMUM TIME ON DIAL  
USE QUARTERS ONLY

- B. Long Term Spaces: Make meters at these spaces capable of the following duration, rates and coinage, and equipped with rate plates:
  1. Duration: 12-hour maximum time on meter.
  2. Rate: \$0.25 per 90 minutes to the maximum time on dial.
  3. Coinage: Quarters only.
  4. Long Term rate plate: Install in each meter an aluminum rate plate which lists duration, rate, coinage and periods of operation; reading as follows:

MAXIMUM TWELVE-HOUR DURATION PARKING  
EFFECTIVE FROM 8:30 A.M. TO 2:00 A.M.  
EXCEPT SATURDAYS, SUNDAYS AND HOLIDAYS  
\$0.25 PER 90 MINUTES TO MAXIMUM TIME ON DIAL  
USE QUARTERS ONLY

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION:**

- A. Install meters in accordance with manufacturer's instructions on posts as shown in the Contract Drawings, providing the materials required for proper installation and operation.
- B. Orient meters facing the curb against which cars park.

**END OF SECTION**

## SECTION 11155

### MECHANICAL PARKING METERS

#### PART 1 - GENERAL

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- B. Related Work Specified Elsewhere:
  - 1. Galvanized steel parking meter post: Section 05500.
- C. Definitions:
  - 1. Short Term spaces: Metered spaces for paid parking up to seven hours from 8:30 AM to 2:00 AM.
  - 2. Kiss and Ride spaces: Metered spaces for paid parking up to seven hours from 8:30 AM to 3:30 PM and from 7:00 PM to 2:00 AM. From 5:00 AM until 8:30 AM and from 3:30 PM to 7:00 PM these spaces are designated NO PARKING, intended to be used only for driver-attended drop-off and pick-up of Metro patrons. Long Term spaces: Metered spaces for paid parking up to 12 hours from 8:30 AM to 2:00 AM.
- D. WMATA Credit: If lock specified for the security vault doors cannot be installed due to unavailability from the lock manufacturer, a WMATA-determined credit or deduction for purchase and installation of the specified lock by WMATA will be applied and used in Bid evaluations

##### 1.02 QUALITY ASSURANCE:

- A. Codes, Regulations, Reference Standards and Specifications:
  - 1. Codes and regulations of the jurisdictional authorities.
- B. Qualifications of the Manufacturer: Provide products of an established manufacturer of mechanical parking meters for at least the last 10 years.

##### 1.03 SUBMITTALS:

- A. Submit the following for approval in accordance with the General Requirements and with the additional requirements as specified for each:
  - 1. Shop Drawings: Details and parts list of specified products. Include manufacturer's installation, operating and maintenance instructions.
  - 2. Samples:
    - a. One meter, meter collection cart and collection box.
    - b. One of each accessory material or tool used for the work or for servicing the meters.
    - c. After approval, samples may be installed in the work.
  - 3. Certification: Document that the parking meters and support equipment are current production models, which the manufacturer has delivered to other purchasers in substantial quantities, and which are in current operational use.

##### 1.04 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Follow manufacturer's instructions to protect mechanisms and finishes from damage.

- B. Deliver spare meters, meter collection carts, collection boxes and other material as directed by the Engineer.

## **PART 2 - PRODUCTS**

### **2.01 GENERAL:**

- A. Provide products and components that are new and unused.
- B. Provide parking meters and components of design and manufacture that have withstood five or more years of dependable on-street performance.
- C. Each meter consists of one mechanism with timer, enclosed in a zinc-alloy upper housing, and one coin canister, enclosed in a cast-iron security vault housing. Duplex meters include two each of the above plus one yoke.

### **2.02 MECHANISM:**

- A. Operation: After deposit of a proper coin and fully turning the operating handle, the time indicator displays the increment of time purchased. Existing time may be increased by deposit of additional proper coins until reaching the maximum time limit of the meter. Total amount of time purchased and time still available are shown after the deposit of each coin. Whenever the operating handle is turned from home position, the Violation Flag is displayed until the rotation cycle is completed.
- B. Mechanism Assembly: The meter operating mechanism is constructed as a completely assembled unit totally separate from the mechanism housing, removable from or replaced in the housing as a whole unit, for inspection or repair, without the use of special tools. The meter mechanism is to be a self-aligning, drop-in unit, that does not require locking studs, pins or screws to secure it into the housing.
- C. Coin Slot: Coin slot is to be on front of the meter next to operating handle and positioned so that coins enter the slot on edge vertically and perpendicular to face of the meter. Coin slot is to be either stainless steel or zinc alloy, sized to specific coin denomination. Meter mechanisms are to automatically close the coin slot entrance during turning of operating handle or in event of a jam, thereby preventing the insertion of additional coins until cleared. The mechanism is to be easily adjusted to maintain proper tolerance between the time winding component and the coin carrier.
- D. Washer Detector: Equip meter with a washer-sensing device to detect improper coinage or washers, passing them through without adding time.
- E. Flags: Mechanism is to have two-flags: TIME EXPIRED and VIOLATION.

### **2.03 TIMER:**

- A. Construction: Use high quality workmanship, with gears and pinions free from burrs, shock-resistant, and with gears, pinions and other components made of non-corrosive materials. Protect timer from dust, moisture and impact by using timer cover made of UV-resistant transparent thermoplastic material, so as to permit viewing of the time without requiring removal of the cover.
- B. Operation: Mechanism clock and timer is to function correctly at temperatures from minus 30F to plus 130F, with an error factor of exact run-out to plus three minutes per hour maximum.

- C. Adjustment: The front balance wheel pivot, or adjustment stud, is to be threaded so it may be used to adjust balance-wheel end play. The back, exposed end, of the arbor shaft is to be machined so that a timer key may be used to either place time on or remove it from the meter mechanism, as well as for use in winding the timer when servicing.

#### **2.04 MECHANISM HOUSING (UPPER HOUSING):**

- A. Construction: Rugged, weather-resistant zinc-alloy case constructed to resist tampering and abuse. Cap portion is to have a clear viewing window made of high-impact-resistant and UV-resistant polycarbonate material.
  - 1. Mechanism housing is to have capability of being set to at least two different housing positions by simple means from within the mechanism housing.
  - 2. Mechanism housing is to be fully interchangeable from one meter to another, or from single to duplex meter units; and vice-versa.
- B. Lock: Access to the mechanism is to be through a tumbler lock and key, but not allow access to the coin compartment
- C. Finish: Chip-and-scratch-resistant, UV-resistant, oven-cured polyester powder coating, with minimum dry film thickness of 2.5 to 3.5 mils. Color as determined by the Engineer.

#### **2.05 SECURITY VAULT (LOWER HOUSING):**

- A. Construction: One-piece cast-iron casting, rugged, weather-resistant, corrosion-resistant, and of such thickness as to resist tampering and abuse.
  - 1. Vault Door is to have same construction as the security vault. Vault door and door opening are to be machined to a tolerance of less than 1/32 inch. Door is to be hinged to the vault compartment using steel pins. Design is to prevent drilling out these steel pins to gain access to the coin compartment using a common hand-held drill and bits. Door locking mechanism is to have a latch arrangement to prevent prying open the door.
  - 2. Bottom of security vault is to fit into a nominal two-inch OD Schedule 40 (standard weight) galvanized-steel pipe, and to fasten securely to the pipe (post) with a self-adjusting three-piece wedge assembly designed so that the unit can only be removed from inside the security vault.
  - 3. Security vaults and vault doors are to be fully interchangeable from one meter to another.
- B. Lock: National KeSet High-Security Lock (part number N42002), matching the series and key combinations reserved for WMATA. Other locks are not to be furnished. See Article 1.1 paragraph entitled WMATA Credit.
- C. Keys: Keys for the lock are to be precision cut from materials ensuring long life, without damage to the lock or tumblers. Key blanks are not to be available from locksmiths. Key delivery is to be via registered letter only to the WMATA recipient designated by the Engineer.
- D. Finish: Chip-and-scratch-resistant, UV-resistant, oven-cured polyester powder coating, with minimum dry film thickness of 2.5 to 3.5 mils. Gray color as determined by the Engineer.

#### **2.06 COIN CANISTER:**

- A. Construction: Sealed box of largest-capacity-available; dent-resistant and of lightweight construction; made of corrosion-resistant metals, high-impact ABS plastic material or both. However, these containers are to be strong enough to resist entry with normal hand tools and breakage from dropping.

- B. Operation: When coin canister is removed from a meter for collection purposes, it can unlock only when inserted into a special receiving device (revenue-collection-head assembly) having an embedded key, which thereby allows coins to drop directly into the collection box mounted on a meter collection cart as specified below. The coin canister prevents coins from being removed by means of inverting or shaking the canister unless it is placed in the revenue-collection-head assembly on the collection box.
- C. Lock: Lock and keying for coin canisters are to be different from those of the mechanism housing and security vault, but are to be the same for all coin canisters and reserved for the exclusive use of WMATA.

**2.07 YOKE:**

- A. Construction: Heavy-duty cast-iron unit designed to receive two single meters as a duplex installation on a single post. Make yokes fully compatible with the parking meters. Bottom of yoke is to fit into a nominal two-inch OD Schedule 40 (standard weight) galvanized-steel pipe, and to fasten securely to the pipe (post) with a self-adjusting three-piece wedge assembly designed so that the unit can only be removed from the inside. There is to be no exposed mounting nut on the yoke or meters when assembled on the post.
- B. Finish: Chip-and-scratch-resistant, UV-resistant, oven-cured polyester powder coating, with minimum dry film thickness of 2.5 to 3.5 mils. Gray color as determined by the Engineer.
- C. Quantity: Provide yokes only where duplex meters are specifically shown.

**2.08 METER COLLECTION CART, COLLECTION BOX AND ACCESSORIES:**

- A. Meter Collection Cart is a wheeled cart designed to securely hold a collection box.
- B. Collection Box is a secure box having lock, hasp and security hinges on its access door. A revenue-collection-head assembly is on the lid of the collection box for receiving, unlocking and dumping contents from the parking meter coin canisters. Collection boxes are to be of rugged enough construction as to resist entry with normal hand tools.
- C. Revenue-Collection-Head Assembly: This is to be fully compatible with the coin canister, and includes an embedded key to unlock the sealed coin canister. The sealed coin canister thereby opens inside the revenue-collection-head assembly causing the canister's contents to empty directly into the collection box.
  - 1. Make embedded key for coin canisters different from keys for the mechanism housing and security vault, but able to open all coin canisters, and reserved for the exclusive use of WMATA.
  - 2. Head assembly is to be so constructed as to prevent unauthorized removal of coins from the collection box.
- D. Finish: Baked enamel or polyester powder coating. Color as determined by the Engineer.
- E. Quantity:
  - 1. Meter Collection Cart: One.
  - 2. Collection boxes: One for each isolated facility where meters are provided.

**2.09 DURATION, RATES, COINAGE AND RATE PLATE:**

- A. Short Term and Kiss-and-Ride Spaces: Make meters at these spaces capable of the following duration, rates and coinage, and equipped with rate plates:
  - 1. Duration: Seven hours maximum time on meter.
  - 2. Rate: \$0.25 per hour to the maximum time on dial.

3. Coinage: Quarters only.
4. Short Term rate plate: Install in each meter an aluminum rate plate which lists duration, rate, coinage and periods of operation; reading as follows:

MAXIMUM SEVEN-HOUR DURATION PARKING  
EFFECTIVE FROM 8:30 A.M. TO 2:00 A.M.  
EXCEPT SATURDAYS, SUNDAYS AND HOLIDAYS  
\$0.25 PER HOUR TO MAXIMUM TIME ON DIAL  
USE QUARTERS ONLY

5. Kiss-and-Ride rate plate: Install in each meter an aluminum rate plate which lists duration, rate, coinage and periods of operation; reading as follows:

PARKING FROM 8:30 A.M. TO 3:30 P.M.  
AND 7:00 P.M. TO 2:00 A.M. ONLY  
EXCEPT SATURDAYS, SUNDAYS AND HOLIDAYS  
\$0.25 PER HOUR TO MAXIMUM TIME ON DIAL  
USE QUARTERS ONLY

- B. Long Term Spaces: Make meters at these spaces capable of the following duration, rates and coinage, and equipped with rate plates:
  1. Duration: 12-hour maximum time on meter.
  2. Rate: \$0.25 per 90 minutes to the maximum time on dial.
  3. Coinage: Quarters only.
  4. Long Term rate plate: Install in each meter an aluminum rate plate which lists duration, rate, coinage and periods of operation; reading as follows:

MAXIMUM TWELVE-HOUR DURATION PARKING  
EFFECTIVE FROM 8:30 A.M. TO 2:00 A.M.  
EXCEPT SATURDAYS, SUNDAYS AND HOLIDAYS  
\$0.25 PER 90 MINUTES TO MAXIMUM TIME ON DIAL  
USE QUARTERS ONLY

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION:**

- A. Install meters in accordance with manufacturer's instructions on posts as shown in the Contract Drawings, providing the materials required for proper installation and operation.
- B. Orient meters facing the curb against which cars park.

**END OF SECTION**

## SECTION 11156

### ELECTRONIC PARKING METERS

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES:

- A. Electronic parking meters, to control and collect revenue for "Short Term" or "Kiss and Ride" parking spaces. They shall be interchangeable with electronic parking meters previously purchased by the Authority. Mounting pole installation and meter location shall be as described below. Meter requirements shall be as described below and as required by manufacturer's instructions. Signs, for patron information concerning metered parking facilities, are not specifically addressed herein. Section 02890 addresses sign requirements.
  - 1. "Short Term" spaces are those metered spaces that authorize parking for up to seven hours between the hours of 5:00 AM to 2:00 AM.<sup>\*1</sup>
  - 2. "Kiss and Ride" spaces are those metered spaces that authorize parking for up to seven hours between the hours of 8:30 AM to 3:30 PM and from 7:00 PM to 2:00 AM. From 5:00 AM until 8:30 AM and from 3:30 PM to 7:00 PM the spaces shall be for drivers dropping off and picking up Metro patrons.<sup>\*2</sup>

##### 1.02 RELATED SECTIONS:

- A. Parking Access and Revenue Control System: Section 11150.
- B. Galvanized steel parking meter post: Section 05500.
- C. Signage: Section 02890.

##### 1.03 REFERENCES:

- A. Codes and regulations of the jurisdictional authorities.

##### 1.04 DELIVERY, STORAGE AND HANDLING:

- A. Delivery of meter communications devices, software, spares, collection cart(s) and other material shall be as directed by the Engineer.
- B. Keys for the meter security vault door lock shall be delivered via registered letter only to the authorized WMATA representative designated by the Engineer.
- C. Ship each unit securely packaged to avoid damage and labeled for safe handling in shipment.
- D. Store all equipment in a secure and dry storage facility until ready for installation or turn over to the Authority.
- E. The Contractor shall be responsible for receipt of all furnished equipment and supplies and for safeguarding the equipment and supplies from pilferage and the effects of weather until accepted by the Authority in final installed configuration.
- F. Deliver spares to storage area designated by the Engineer.

##### 1.05 ENVIRONMENTAL REQUIREMENTS:

- A. The meters shall automatically compensate to ensure accurate operation and coin discrimination at all temperatures between minus 20 degrees and plus 140 degrees Fahrenheit. It shall function properly under Metropolitan D.C. conditions of solar loading, rain, snow, sleet, grime and street vibrations.

**1.06 SUBMITTALS:**

- A. Documentation shall be submitted showing that the parking meters and support equipment are current production models, which the manufacturer has delivered in substantial quantities, and which are in operational use.
- B. Integrated Logistics Support shall be provided as required by Section 11150.

**1.07 DURATION, RATES AND COINAGE:**

- A. The meters shall be programmable, using personal computers already in the offices of PARK, Contractor-provided software and a Contractor-provided remote programming device. The program capabilities of the meters shall include ability to accept from one to a minimum of five different coins and the pre-paid stored value smart card (debit card), permit variable maximum times up to 12 hours, and vary the rates for different periods of the day and different days of the week. The meters shall be capable of field programming using the remote programming device.
- B. The following duration, rates and coinage shall be used for the initial factory setting:
  - 1. Seven-hour duration.
  - 2. Rate of one hour per quarter to seven hours.
  - 3. Accept debit cards or quarters only.
- C. In "Short Term" facilities the meter shall be provided with an installed aluminum rate plate which lists duration, rate, coinage accepted and periods of operation as follows:
  - 1. MAXIMUM SEVEN HOUR DURATION PARKING EFFECTIVE
  - 2. FROM 5:00 A.M. TO 2:00 A.M.
  - 3. EXCEPT SATURDAYS, SUNDAYS AND HOLIDAYS
  - 4. \$0.25 PER HOUR TO MAXIMUM TIME ON DIAL
    - a. USE QUARTERS OR DEBIT CARDS ONLY
- D. In "Kiss and Ride" facilities the meter shall be provided with an installed aluminum rate plate which lists duration, rate, coinage accepted and periods of operation as follows:
  - 1. PARKING FROM
    - a. 8:30 A.M. TO 3:30 P.M. AND 7:00 P.M. TO 2:00 A.M. ONLY
  - 2. EXCEPT SATURDAYS, SUNDAYS AND HOLIDAYS
  - 3. \$0.25 PER HOUR TO MAXIMUM TIME ON DIAL
    - a. USE QUARTERS OR DEBIT CARDS ONLY

**PART 2 - PRODUCTS**

**2.01 ELECTRONIC MECHANISM:**

- A. The meter mechanism shall be fully electronic with solid state modular components. It shall be capable of accepting a coin, a debit card, or a combination of coins and card. The electronics shall be resistant to electromagnetic interference.
  - 1. When using coins, the meter time indicator shall display the time purchased after deposit of a proper coin. Existing time shall be incrementally increased by the deposit of additional proper coins until the maximum time limit of the meter is



- reached. Total amount of time purchased shall be shown after the deposit of each coin.
2. When using the card, the meter time indicator shall display the amount of time purchased, increasing this amount until the card is removed, the debit limit on the card is reached, or to the maximum time limit of the meter.
  3. There shall be no requirement to turn handles or push thumb slides on the meter when purchasing time.
- B. The meter operating mechanism shall be constructed as a completely assembled modular unit separate from the meter housing. The mechanism frame, coin chute, battery and card reader shall be removed from or replaced in the meter housing, as separate units, without the use of special tools.
- C. The coin and card slots shall be flush on the front of the meter and so positioned that coins and cards enter the slot at a 90-degree angle to the mechanism display face. Slots shall be metal and vandal resistant.
- D. The coin chute shall be single slot, jam resistant, and made of stainless steel or zinc alloy. It shall deposit coins in the security vault coin cannister. It shall be equipped with a detector for washers, plastic discs, slugs and other spurious coin substitutes which shall pass while not adding any time. This detector shall not have any points susceptible to grime or moisture failure. Withdrawal of a valid coin through the coin chute shall remove the time purchased by the coins insertion.
- E. The power supply for the meters shall be a six-volt lithium battery. New batteries shall be supplied for each meter in the contract. The battery shall be capable of installation and removal without tools.

## **2.02 INDICATION:**

- A. The time display shall be a four-digit liquid crystal display (LCD) with one-half inch characters. It shall be mounted on the front of the meter tilted up for maximum patron visibility. The display shall be readable in bright sunlight and low light conditions. Two characters shall indicate hours and two shall indicate minutes. The hours and minutes characters shall be separated by a colon that flashes in one second beats. The display shall function at all temperatures between minus 20 degrees and plus 140 degrees Fahrenheit. The timer LCD shall also indicate when the meter is malfunctioning by an easily understood symbol or character display.
- B. On the rear of the meter shall be a status indicator similar in concept to the time expired and violation flags used on mechanical meters. This display shall be visible from a distance of at least 70 feet in both glare and low light conditions. The display shall be green when time is registered on the meter, bright red when time is expired and yellow when there is a meter jam or failure. This status indicator shall not require power to operate and maintain visibility of a status indicator except when changing status modes.
- C. The viewing lens shall be made of high impact resistant polycarbonate materials.

## **2.03 MECHANISM HOUSING:**

- A. The entire mechanism shall be enclosed in a rugged, weather-resistant zinc alloy case constructed of such a thickness as to resist tampering or abuse. The mechanism housing shall be coated with a corrosion and ultraviolet light resistant finish.

- B. Mechanism housing compartments shall be fully interchangeable from one meter to another, or from single to double meter units; or vice-versa. Access to the mechanism shall be through a separate lock combination and key, and shall not allow access to the coin compartment housing.
- C. Mechanism housings of double meter units shall be capable of being re-positioned to at least two different orientations by simple means from within the mechanism housing.
- D. All meter housings shall be designed to fit into a standard two-inch I.D. schedule 40ST galvanized steel pipe, and fasten securely with a self-adjusting three piece wedge assembly designed so that the unit can only be removed from inside the coin compartment housing.
- E. A single meter shall consist of one operating mechanism enclosed in a zinc alloy housing and one collection canister enclosed in a cast iron security vault housing.
- F. A yoke unit shall consist of a cast iron unit on which two single meters will be installed for mounting on a single post. The yokes shall be fully compatible with the parking meters furnished in this Contract. The yoke shall be designed to fit into a standard two-inch I.D. schedule 40ST galvanized steel pipe, and fasten securely with a self-adjusting three piece wedge assembly designed so that the unit can only be removed from the inside. There shall be no exposed mounting nut on the yoke and meters once assembled on the post.
- G. All parking meters shall have a separate coin collection cannister for each operating mechanism housing. Double meters shall not share a single collection cannister.
- H. Access to the mechanism housing shall be through a lock combination and key that shall not allow access to the meter security vault housing.

**2.04 METER SECURITY VAULT:**

- A. The security vault housing shall be a one-piece cast-iron casting. The housing shall be rugged in construction, weather and corrosion-resistant, and of such thickness as to resist tampering or abuse. It shall be coated with a corrosion-resistant gray finish.
- B. Vault doors shall be of the same material as the vault housing. The vault door and door opening shall be machined to a tolerance of less than one thirty-second of an inch. They shall be hinged to the vault compartment using steel pins. It shall not be possible to drill out these steel pins to gain access to the coin compartment using a common hand-held drill and bits. The door locking mechanism shall have a latch arrangement to prevent the door from being pried open.
- C. The meter security vault door lock shall be a National KeSet High Security Lock (part number N42002), or equal, matching the series and key combinations which have been reserved for WMATA.
- D. Keys for the lock shall be precision cut and manufactured of materials which ensure long life, without damage to the lock or tumblers. Key blanks shall not be available from locksmiths.

**2.05 COIN CANISTER:**

- A. Each meter shall include a sealed, expanded-capacity or largest capacity available coin canister, which shall be dent resistant and of lightweight construction. They shall be made of corrosion-resistant metals, high-impact plastic ABS or Cycloc materials. However, these containers shall be of strong enough construction to resist entry with normal hand tools and breakage from dropping. When the coin cannister is removed from the meter for collection

purposes, it shall then be inserted into a receptacle with an embedded key to unlock the canister in the receiving device mounted on a collection cart, causing coins to drop into the cart container. The coin cannister shall be equipped with a device which restricts the coins from being removed by means of inverting or shaking the container when it is not inserted in the revenue-collection head assembly on the collection cart container.

- B. Lock combinations of the coin canisters shall be different from either the mechanism housing or meter security vaults.

## **2.06 PREPAID STORED VALUE SMART CARD (DEBIT CARD):**

- A. The WMATA cards are pre-programmed, micro-chip technology with the following features:
  - 1. ISO 7816-1 and ISO 7816-2 compatible.
  - 2. Dimensions of 54.0 mm high by 85.6 mm wide by 0.76 mm deep. Corners rounded with a radius of 3.18 mm. Edge burrs normal to the card face not to exceed 0.08 mm above the card surface.
  - 3. Single five-volt power supply.
  - 4. CMOS technology.
- B. Cards have a pre-programmed value of \$50. This value will decrement as it is used at the times and rates described above.
- C. Cards operate in two memory modes, an issuer mode and a count down mode. After a card has been personalized, a count down mode is generated for use.

## **2.07 COMMUNICATIONS AND DATA TRANSFER:**

- A. Meters shall be capable of communicating with a portable, battery-powered, hand-held computer communications device supplied with this Contract.
- B. The communications device shall be used to:
  - 1. Re-program time, coinage and rate structures.
  - 2. Retrieve audit information such as currently programmed time, coinage and rate structure, serial number, transaction information, battery charge, maintenance information and programming information.
  - 3. Assign serial numbers.
  - 4. Enter maintenance information.
- C. The Contractor shall provide the communications device interface and software to upload and download of programming and data on an existing IBM-compatible personal computer in the offices of PARK.
- D. The device shall communicate with meters on an infrared band.
- E. The device shall provide an audio and visual signal when sending or receiving.
- F. Device power supply shall be a Contractor-provided nine-volt, rechargeable, NICAD battery pack and recharger.

## **2.08 METER COLLECTION CART:**

- A. Meter Collection Cart shall consist of a cart and parking meter head assembly compatible with the collection canisters for the meters.

- B. It shall be a wheeled cart with a security lock and security hinges on its access door. A revenue- collection head assembly is to be provided for receiving and dumping the coin canisters from the parking meters. This head assembly shall include an embedded key to unlock the sealed coin canisters. The coin canister is then opened inside the head assembly emptying the contents into the collection cart. All containers and embedded keys shall be of the same lock combination and shall be reserved for the exclusive use of WMATA. The head assembly shall be constructed to prevent unauthorized removal of coins from the collection cart. The carts shall be of rugged construction to resist entry with normal hand tools.

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION:**

- A. Installation at the indicated locations in accordance with manufacturer's instructions. Installed meters shall be oriented normal to the pavement marking lanes for parking space they serve. All pipe and other material required for accomplishment shall be provided by the Contractor. Mounting post pipes shall have a rainwater drain hole.

**SEE ENDNOTES BELOW. THEY ARE AN ESSENTIAL PART OF THIS SECTION UNTIL EDITED BY SECTION DESIGNER.**

#### **ENDNOTES**

- \*1. Not all facilities will include both "Short Term" and "Kiss and Ride" parking. This specification section will have to be tailored as appropriate. Add 1.1 A.1. modification to all contracts that include "Short Term" parking.
- \*2. Not all facilities will include both "Short Term" and "Kiss and Ride" parking. This specification section will have to be tailored as appropriate. Add 1.1 A.2. modification to all contracts that include "Kiss and Ride" parking.

**END OF SECTION**