CITY OF DOVER
ELECTRIC SERVICE HANDBOOK

Approved by City Council October 2022

CITY OF DOVER
ELECTRIC DEPARTMENT
860 BUTTNER PLACE
DOVER, DE 19901

The Electric Department consists of a dedicated team of individuals who provided superior electric service and support to the customers of the City of Dover. Divided into three divisions, Transmission and Distribution, Engineering Services and Administration, the 40+ employees perform activities such as construction, maintenance, engineering design, engineering support, mapping, relay/substation maintenance, 24/7 system operations, metering, financial and administrative support.

The guidance listed in this handbook will provide existing or potential customers with information on a variety of topics. Whether installing a new service, requesting a new light for your property or procedures for installing renewable energy systems it should be covered in here. If you would like to speak to a representative in the office, please refer to the following phone listing:

Engineering Support – 302-736-7072

> *Focal point for electricians, contractors, and builders to contact regarding electrical services, applications, service requirements, scheduling trench inspections and appointments for field engineering site visits.*

System Operations – 302-736-7086, option 3

> *This would be for reporting power outages, light outages, **after hours** support for all City Departments (1630-0700)*

Administrative Services – 302-736-7070

Customer Service – 302-736-7035

> Obtaining information regarding rates, billing questions, deposits, credit information, new service applications and security lights.

Goals:

1. The primary goal of the Electric Department is to safely provide highly reliable electric service.
2. To plan and perform our work in an efficient and minimally impactful manner.
3. Promote cross communication with the customer and treat everyone respectfully.
4. Formulate long range upgrade plans

Our Mission Statement is:

"To support the current and future growth of all residential, commercial, industrial and defense customers we serve by safely providing reliable and affordable electricity while being economic and environmental stewards and continually looking for areas of improvement."

Our Five Year Vision is:

"To offer exceptional service to our customers by integrating new technologies while being respectful of resources, financials, employees and the people we serve."

STATE APPROVED INSPECTION AGENCIES

The link below is the most current list of approved inspection agencies in Delaware. Please refer to the DPR.Delaware.gov website for the most current listing. The City of Dover does not perform any electrical inspections of private, commercial, and industrial property.

https://dprfiles.delaware.gov/electrician/Licensed_Elec_Inspection_Agencies1.pdf

Call Miss Utility at 811 or 800-282-8555 to locate the underground facilities (all utilities may not be members of this organization).

For those who are about to dig anywhere on the Delmarva peninsula, this one call enables you to make one toll free telephone call to have the member companies' facilities located. To check on the status of a locate ticket, go to https://call811.com/811-In-Your-State/Map/State/Delaware

Privately owned utilities will not be located by the members of this organization. Any damages to underground facilities due to digging prior to marking will be the responsibility of the person or entity that struck the facility. In the event a facility is struck, contact 736-7086 option 3 to report the damage.

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SECTION 1

GENERAL

I. GENERAL INFORMATION

1. This Handbook is designed to be used as a reference and contains the rules and regulations regarding the requirements, policies, and procedures between customers, contractors, architects, engineers, and the City Electric Department, here forward known as "The City". The City has the right to change, modify, or charge for services not normally performed to protect the interest of the City and the rate payers.

2. There shall be an Electric Director who has authority over the Electric plant, Electric Transmission & Distribution System and their appurtenances and is under the general supervision and authority of the City Manager.

3. The City will cooperate in every way in completing service connections as promptly as possible and will give special attention to unusual problems which may confront the customer, contractor, architect, or engineer. The City reserves the right to change service requirements where non-standard circumstances exist.

4. Observance of the requirements contained herein will enable the City to render prompt and satisfactory service. Assistance in the interpretation or clarification of these requirements may be obtained by contacting the Electric Department at 302-736-7070 or Customer Service at 302-736-7035.

5. The requirements in this handbook do not replace, but are supplemental to, the ordinances adopted by the Dover City Council.

6. The City may supplement, alter, or otherwise change the policies contained herein as may be necessitated by changing conditions, for the protection of the interest of the customer, the City or the general public. It will be the responsibility of the contractor, electrician, developer, etc., to obtain and keep current their copy of this handbook. The most current version of this document will be found on the City of Dover website.

7. The standard electric service supplied by the City is alternating current with a nominal frequency of 60 hertz (cycles per second).

8. As the voltage, number of phases and type of metering which can be supplied depends upon the City's facilities available at or near the customer's location, the customer shall consult the Electrical Engineering division at 302-736-7070 before proceeding with the purchase or installation of wiring or equipment.

9. **THE CITY DOES NOT GUARANTEE CONTINUOUS ELECTRIC SERVICE AND WILL NOT BE LIABLE FOR ANY LOSS, COST, DAMAGE OR EXPENSE TO ANY CUSTOMER OCCASIONED BY AN INTERRUPTION, LOSS OF PHASE OR PHASE REVERSAL IF DUE TO ANY CAUSE BEYOND THE REASONABLE CONTROL OF THE CITY.**

    a. The City **shall not** be liable for damages resulting from the presence of electric current associated with the City's equipment on the customer's premises, or from the use of electric service of the City by the customer.

10. When it becomes necessary to make repairs to or changes in the City's electric system, the City may suspend the delivery of service for such periods as may be reasonably necessary without incurring any liability because of such service interruption. However, when possible the City will make every reasonable effort to schedule such repairs and changes with its customers.

11. The customer is responsible for trimming trees on private property to provide necessary clearance for electric service drops. This should only be done by qualified persons familiar with this type of work. The City will assist removing tree limbs which have broken and are lying on the service drop upon request.

12. In all cases where new installations, alterations or additions to existing installations are to be made, the Electric Engineering Division must also be consulted about the size and character of the anticipated electric load so they may advise the customer about the electric facilities available at their specific location. These consultations are distinctly advantageous to the customer or representatives so that errors in equipment ratings and any deficiency in electric service capacity available at a given location may be avoided. Advance consultation may also avoid unnecessary additional expense or delays on the part of the customer or their contractor.

13. Furnishing electric service to a prospective customer is necessarily dependent upon the ability to obtain adequate rights-of-way and/or easements for this purpose from the customer.

14. Service entrance, meter and wiring on temporary installations shall be installed in the same manner as for permanent installations.

DEFINITIONS

Terms used in this document shall have the following meanings:

1. **ACCOUNT –** An account is one metered or un-metered rate or service classification which normally has one electric delivery point of service. Each account shall have only one electric service supplier providing full electric supply requirements for that account. A premise may have more than one account.

2. **APPROVED** when referring to a customer's electrical installation, shall have met the requirements of an authorized inspection agency. "Approved" when referring to equipment or material, shall have met the standards of a recognized laboratory, or a standard/design recognized by the City.

3. **CITY** as used throughout this handbook refers to the City of Dover Electric Department.

4. **CONDUCTOR – SERVICE** shall mean all overhead or underground electric conductors and appurtenances located between the last pole or underground terminal of the City's electric power conveyance system and the point of connection with the customer's electric wiring.

5. **CUSTOMER** is any adult person, partnership, association, corporation, or other entity: (i) in whose name a service account is listed, (ii) who occupies or is the ratepayer for a premises, building, structure, etc., and (iii) who is primarily responsible for payment of bills. A customer includes anyone taking Delivery Service or combined Electric Supply & Delivery Service from the City under one service classification for one account, premises or site. Multiple premises or sites under the same name are considered multiple customers.

6. **DISTRIBUTED GENERATION or ON-SITE DISTRIBUTED GENERATION** is an electrical generating unit of less than or equal to 500 kW which may be connected in parallel operation to the City's system.

7. **ELECTRIC APPARATUS** shall mean any condenser, conductor, transformer, adapter, electrical generator, electrical appliance, or any article through which or by means of which electricity is carried, consumed, or created.

8. **ELECTRIC DEPARTMENT** shall mean that Department of the City authorized by Section 25 of the Dover Charter (1961) that supplies electric power to the City and its inhabitants and certain other customers.

9. **ELECTRIC WIRING** shall mean any wiring which, at any time, is used to conduct electric current or energy.

10. **EXCESS kWh CREDIT** is valued at the sum of the volumetric components of the supply service charges and distribution service charges, not including the charges for societal benefits programs, according to each participating customer account's rate schedule.

11. **EXTENSION** is any construction beyond the normal service facilities (which include the service extension to the customer, transformers, transformer devices, service drop and meter) to extend the distribution system along the normal route of development of the distribution system to the point where the extension departs from the normal route development and is being installed as a service extension solely for the customer.

12. **GENERAL MASTER ELECTRICIAN** shall mean a person engaged in the business of, or holding himself out to the public as engaged in the business of installing, erecting and repairing, or contracting to install, erect or repair, electric wire or conductors to be used for the transmission of electric current for electric light, heat or power purposes, or moldings, ducts, raceways or conduits for the reception or protection of those wires or conductors, or to electrical machinery, apparatus, devices or fixtures to be used for electric light, heat or power purposes, or planning, estimating or laying out and supervising that electrical work as licensed by the State of Delaware.

13. **GENERATOR OWNER** is the owner of the generating system that is interconnected to the City.

14. **GRID** is the interconnected arrangement of lines and transformers that make up the City's electric power system.

15. **GROUP METERING** refers to those meter installations at multiple occupancy buildings where the individual meters for several customers are arranged in a bank or grouping in the same area and are energized from the same service point.

16. **INSPECTION AGENCY** means the person or agency duly authorized and licensed by the State of Delaware to make such inspections. The City will render service only after receipt by the City of a notice of approval issued by a recognized inspection agency.

17. **INTERCONNECTION** is the physical connection of distributed generation to the City's system in accordance with these guidelines so that parallel operation can occur.

18. **INTERCONNECTION APPLICATION** is the standard form of application which must be submitted by the Generation Owner to the City for permission to interconnect with the City system. The approved Interconnection Application sets forth the contractual conditions under which the City and Generator Owner agree that one or more generating units whose aggregate generation at the Point of Common Coupling is less than or equal to 500 kW may be interconnected at 12.47kV or less with the City's system.

19. **INVERTER** is a static power converter with control, protection and filtering functions that converts Direct Current input to Alternating Current output. Inverters must meet the specifications of IEEE 1547 and UL 1741, Anti-Islanding Protection to be installed on the City's grid.

20. **ISLAND** is defined as a portion of the utility system which contains both load and distributed generation and is isolated from the remainder of the utility system.

21. **NATIONAL ELECTRICAL CODE (N.E.C.)** refers to the latest edition of the National Electrical Code suggested for adoption by the National Fire Protection Association and can be found at https://www.nfpa.org/

22. **NATIONAL ELECTRICAL SAFETY CODE (N.E.S.C.)** refers to the latest edition of the National Electrical Safety Code approved by the American National Standards Institute (ANSI) and can be found at http://standards.ieee.org/about/nesc/.

23. **NON-RESIDENTIAL** shall mean a place of business, public, utility, private, or lighting service, apartment home or building, condominiums and any other service not installed to feed an individual residence. All services shall be individually metered.

24. **PARALLEL OPERATION** is any electrical connection between the City's system and the Generator Owner's generating source.

25. **POINT OF COMMON COUPLING** is the point where the electrical conductors of the City system are connected to the customer's conductors and where any transfer of electric power between the Generator Owner and the City System takes place (such as switchgear near the meter).

26. **PRE-APPROVED EQUIPMENT** is a specific generating and protective equipment system(s) that have been approved by the City as meeting the applicable parts of this document for a specific function and application.

27. **PRE-INTERCONNECTION STUDY** is a study or studies which may be undertaken by the City in response to its receipt of a completed application for parallel operation with the City's system submitted on the Interconnected Application form prescribed by these guidelines. Pre-Interconnection Studies may include, but are not limited to service studies, coordination studies and facilities impact studies.

28. **PRIMARY SERVICE** is defined as conductors and equipment rated for voltages greater than 750 volts.

29. **QUALIFYING FACILITY (QF)** is cogeneration facility or a small power production facility that is a qualifying facility under Subpart B, Section 292.202 of the Federal Energy Regulatory Commission's regulations per the Public Utility Regulatory Policies Act of 1978.

30. **RESIDENTIAL** shall mean a structure, dwelling or home in which one (1) electrical service is run to feed an individual customer.

31. **SEASONAL ELECTRICAL SERVICE** shall mean electric service required for a period of less than one (1) year at a permanent location or at the same location annually for a particular event or a season of the year.

32. **SERVICE** has several meanings, depending upon its contextual use.

    a. It may be used as a general reference to the supply of electricity by the City for the use by the customer.

    b. It may refer to the conductors which physically connect the utility lines and the customer's electric facilities. These may be primary or secondary voltage, and overhead or underground. When overhead, the service is generally called an "Overhead Service". When underground, the service is generally called an "Underground Service".

    c. It may mean the actual physical tie, or the act of making that physical tie between the City's distribution or service conductors and the customer's electric facilities. This is more generally known as a "Service Connection".

33. **SERVICE ENTRANCE** refers to the customer owned cable/equipment (generally conductors, overhead and underground conduit, and meter socket) which is located between their service connection and the service receiving equipment (main switch, distribution panel, load center, etc.).

34. **STABILIZED** is a condition of City's system following a disturbance which returns to the normal range of voltage and frequency for at least 5 minutes or longer as coordinated with the City. The City may require a longer period upon a reasonable showing that the reconnection after 5 minutes will adversely affect the safety and reliability of the electric system.

35. **STARTING CURRENT** when this term is applied to a motor or other electrical device, means the maximum current per phase drawn by the motor or device.

36. **SUPPLY SERVICE CHARGES** are the costs of providing electrical services to the customer. This is reflected in the charge per kWh on the utility bill and does not include other charges such as the Customer Charge, Demand Charge or Power Factor Adjustment.

37. **UNDERWRITERS LABORATORIES, INC.** refers to the Underwriters Laboratories, Inc., headquartered at 333 Pfingsten Road, Northbrook, Illinois 60062.

38. **UNIT** is defined as a distributed generation facility.

39. **UTILITY SYSTEM or ELECTRIC DISTRIBUTION FACILITY** is the City's distribution system operating at 12.47 kilovolts or below to which the generation equipment is interconnected.

SUPPLY VOLTAGES

1. In this Handbook, all references to voltages are standards or nominal voltages and actual voltages supplied may vary above or below these values within the limits prescribed by accepted good practice and the regulatory authorities having jurisdiction. Generally, voltage should stay within plus or minus ten percent of nominal voltage. The City may specify the voltage and the minimum and maximum load that it will supply at any particular voltage. The customer is responsible for using appliances of the correct voltage rating (240V motors are not to be used with 208Y/120 volt).

2. Not all types of electric service listed below are available at all locations. Subject to limitations, the class of secondary electric service available, with the nominal voltages are:

CLASS OF SERVICE

Single-phase	3 wire	120/240 volts
Three-phase	4 wire	208Y/120 volts
Three-phase	4 wire	480Y/277 volts

3. Existing 120/240 volt three-phase services will be maintained until such time the service is upgraded, changed, or disconnected.

4. Primary electric service also may be available at 12470/7200 volts but is dependent upon location and size or type of the load to be served. Such electric service may be made available under suitable contractual arrangements, as determined by the City under the applicable electric service ordinances, rules and regulations, and electric tariffs approved by City Council.

INSPECTIONS

1. The City will render electric service from its distribution system to any facility only after receipt by the City of a State of Delaware recognized electrical inspection agency certificate.

2. All new wiring and equipment, or changes in wiring and equipment, must be installed in accordance with the latest edition of the National Electrical Code (N.E.C.) and the City's requirements to be approved for connection to the City's electric system.

3. The City may refuse to render service to a customer where it has knowledge of, or reason to believe, that the customer's wiring or equipment does not comply with recognized requirements. The City shall be under no obligation to inspect the wiring and equipment of any customer.

4. Trench inspections, when made by the City, are to ensure compliance with its own requirements and to cooperate with customers, contractors, architects, and engineers. The City does not assume the responsibility for the customer's wiring or equipment or for any loss, injury, or damage that may result from any defects that may exist in the customer's wiring or equipment.

5. The City will issue an inspection wavier only for an existing service and will only be issued to the owner or approved licensed electrician. Waivers will be issued when the City determines the connection is an emergency. Waivers must be cleared through a follow up inspection within 15 calendar days. If the wavier is not cleared within 15 calendar days, the service will be disconnected.

II. EXTENSIONS AND SERVICES

1. The City will construct line extensions to supply service to customers in residential, commercial, or industrial developments in specific areas, upon payment of primary extension fees calculated by using the current cost of equipment to complete the extension. The developer (or property owner) provides, without charge to the City, right-of-way for lines and equipment which is suitable in the opinion of the City for the installation of City facilities throughout the development. Suitable right-of-way includes, but is not limited to, providing ground line clearing of trees, brush and other obstructions, rough grading, and access by mechanical construction equipment. When restoration of service to the premise is not possible due to an obstruction the customer, or the owner of the property on which the obstruction is situated is responsible for removing the obstruction.

2. The City will extend and maintain the service to a point of connection determined within the service classifications defined in the Rates and Tariffs Handbook. If your service is classified as Residential, the City will maintain the service up to the meter pan and to include the meter. If your service is classified as commercial, the City will maintain up to the nearest point of connection, i.e., transformer or pedestal. From this point up to the meter pan is the responsibility of the service owner. For extensions utilizing 500 MCM or smaller wire, the City will provide the appropriate connector.
    a. Residential Overhead – The City will extend its system to the service mast or service drop attachment;
    b. Residential Underground - The City will extend its system to the meter enclosure;
    c. Commercial Overhead – The customer will be responsible for the service to the nearest point of connection, generally at or near the property line;
    d. Commercial Underground – The customer will be responsible for the service to the nearest point of connection, generally at or near the property line.

EXTENSIONS – RESIDENTIAL AND NON-RESIDENTIAL

1. Underground & overhead extensions (overhead only allowed under special circumstances with final determination and approval, solely determined by the City) will be designed by the Engineering division to the point of ownership designated in the service classification. Service point locations will be determined by the City and the City will extend the service to the designated point of connection.

    a. **Non-residential** – The owner/developer shall supply and install all conduits per City design and standards and will be responsible to pick up and install all below grade equipment, pads and pedestals per the City specifications from the City warehouse. The owner/developer will be responsible for 100% (including current warehouse

overhead rate) of the material/equipment cost as quoted in the primary extension fee; however, the City will continue to own and maintain this equipment. The City will not accept or install any materials supplied by the contractor or customer.

b. **Residential** developments having more than one (1) home will have a set fee that is recalculated annually based on 100% material costs (including current warehouse overhead rate) for City determined average development. Please contact the Engineering division at 302-736-7070 for the current per lot rates for developments. The developer will be responsible to supply and install all conduits per City design and standards. The developer will be responsible to pick up and install all below grade equipment, pads and pedestals per the City specifications from the City warehouse. Due to the size of some developments, the extension fees ***may*** be paid on a mutually agreeable lot phasing plan. These fees will be subject to the "per lot" fee at time of payment.

c. Single residential homes not part of a group development shall supply and install all conduits per City design and standards. The owner/developer will be responsible to pick up and install all below grade equipment, pads and pedestals per the City specifications from the City warehouse. The owner/developer will be responsible for 100% of the material/equipment cost (including current warehouse overhead rate).

SERVICES – RESIDENTIAL AND COMMERCIAL

1. All new services will be installed underground to the City's designated point of connection. Any upgrades, alterations, or changes being made to an existing overhead service may require the owner, at their expense, to bury the overhead lines to underground. No service shall be tampered with in anyway without notifying the Electric Department prior to work being performed.

2. Customers may request to have the service disconnected or request to have the meter seal removed by a qualified electrician to make repairs on the customer owned facility. Any changes or repairs that require the neutral of the service to be broken will require an electrical inspection by a State of Delaware Inspection Agency. All services must be in accordance with latest version of NEC and NESC.

3. Should an existing service require a service mast, the following will apply:
   a. Service masts of galvanized steel conduit or other metal masts of equivalent strength may be used.
   b. Minimum size acceptable is 2 inch galvanized rigid conduit and shall normally be limited to a height of 3 feet above the roof without guying, for up to a 200-amp service.

4. The attachment for the overhead service shall be supplied by the customer/contractor. Service drop wires should be installed over buildings and roofs as per NEC. No service drop will be installed over a swimming pool.

MANUFACTURED HOME PARKS

1. All applicable provisions of this Article shall apply to electric service in manufactured home parks. Manufactured home park operators shall comply with this handbook. Since July 1, 1982, all manufactured home parks shall not be installed under a "single meter" service classification which means they are prohibited from reselling electric power.

All manufactured homes must also conform to the N.E.C. regulations for manufactured homes, and any changes necessary will be at the expense of the owner.

2. The manufactured home park operator is responsible for contacting the City for the design of the electrical distribution system at the manufactured home park to permit the delivery of energy through individual meters to each manufactured home tenant.

3. The City will supply all facilities as required up to the meter socket pedestals. Installation of meter socket pedestals is the sole responsibility of manufactured home park operator. The location of the meter sockets will be determined by the City Electric Engineering division. In accordance with *City of Dover Ordinance #2016-16*, page 3, Sec. 66-5, paragraph (a) iv, community owners are responsible to coordinate with the City regarding utility services and equipment. This is to include the notification of empty lots in a timely manner to allow the City to remove any unused equipment until the lot is occupied. The manufactured home park owner is responsible for any electrical work from the load side of the meter to the manufactured home.

4. To calculate fees, manufactured homes will be classified as primary extensions – non-residential and will be billed at 100% material costs (including current warehouse overhead rate).

III. LIGHTING

GENERAL

1. It is the current policy of the City to equip new developments with Light Emitting Diode (LED) lights to reduce energy usage. Please refer to the Rates and Tariffs Handbook to view the most current rates for lighting options available. The City reserves the authority to trim vegetation and/or trees in the public right-of-way to ensure that lighting is not blocked, or the area shadowed because of this growth.

SECURITY LIGHTS

1. Un-metered security lighting will be installed by the City and billed at the appropriate tariff rate. Such lighting will be installed on existing City poles or lighting service poles may be installed on public or private property by the City as per the City's lighting policy. Pole and light type will comply with the current City policy. Customers who apply to have a security light installed accept a two (2) year minimum contract with the City. If at any time the contract is terminated within two (2) years of execution, the prorated installation and full removal cost of the light will be billed to the customer.

2. Decorative and roadway poles are optional for security lighting in residential areas at the appropriate tariff rate. Decorative and roadway poles require a five (5) year minimum contract. If at any time the contract is terminated within five (5) years of execution, the prorated installation and full removal cost of the light will be billed to the customer.

3. Lighting types and styles may be changed without notice. If the current type/style is no longer available, a suitable replacement of similar size and style will be installed by the City and the appropriate rate will apply.

STREETLIGHTS

1. Existing City maintained or Annexed Streets

   a. City residents must submit a request for street lighting to the Electrical Engineering Division at 302-736-7070.

   b. A calculation of the amount of required lighting is completed, the cost of installation and operations, and a decision is made concerning the application of street lighting based on standards for roadway lighting for pedestrian or vehicular traffic.

2. New Developments (Streets)

   a. The Electrical Engineering Division designs and furnishes to the developer the layout plans and specifications for the lights. The City retains the sole authority to determine the lighting requirements and the installation sequence for the development. The plans will be submitted to the developer along with the electrical extension plans.

   b. The developer is responsible for the installation of the conduits and below grade equipment according to the plans and specifications. The developer will be responsible for the rental costs of all street or alleyway lights, as per the applicable tariff rate, until such time as the streets are dedicated to the City.

   c. The City will install the standard street light pole and LED head for the current market rate; this fee will be routinely re-evaluated and will recover 100% of the material cost (including current warehouse overhead rate). This fee will be billed at the same time as the "extension - lot fee" which is collected prior to the installation of any electric facilities, see Section II, page 17. Any non-standard street light installation will be based on the actual cost of the materials (including current warehouse overhead rate), for example the lights at Eden Hill. The City **will not** be responsible for maintaining the stock of non-standard streetlights, this will be the responsibility of the customer or developer.

3. Developments Outside of City or Private Streets

   a. Residents must submit a request for street lighting to the Kent County Engineering division, (302) 744-2430 or the State of Delaware Department of Transportation, (800) 652-5600.

   b. A determination is made of the number of lights required; and both parties shall agree to the design before construction begins. The same tariffs apply as security lighting with minimum five (5) year minimum contract based on the style of light.

IV. MOTOR PROTECTIVE DEVICES

1. All motor protection devices shall be installed and maintained by the customer.

a. All motors, single or three-phase, shall contain devices that will protect the motor and circuit against overload or short circuit. Refer to the N.E.C. for motor protection details.

b. Motors equipped with reduced voltage starters that cannot be safely subjected to full voltage at starting shall contain a device to ensure that, on the failure of the supply voltage, the motor will be disconnected from the line and the starter returned to the "off" position. To prevent unnecessary shutdowns, it is recommended that this starter be equipped with time delay feature to prevent the starter from dropping out and to permit the motor to continue to operate during a momentary voltage change.

c. The direction phase rotation and the continuity of all three phases of the alternating current supply are carefully maintained; however, the City cannot guarantee against accidental or temporary change or failure thereof. Therefore, motors or other apparatus requiring unchanged phase rotation or continuity of three-phase supply shall be equipped, by the customer, with suitable three-phase protection against reversal or phase failure.

V. GENERATORS

1. The City must always be consulted concerning the installation of any emergency electric generating equipment. In all cases of emergency standby generation (non-cogeneration) a double throw switch shall be installed between the generator and the City's supply as per N.E.C.

2. Cogeneration and Solar equipment are subject to the rules and regulations contained in the Interconnection Agreement. Please refer to Chapter 4, Net Metering in this handbook for more details.

VI. POWER FACTOR CORRECTION

1. Attention is called to the desirability and importance of maintaining the power factor of any load as near unity as possible. A high power factor will increase the capacity of conductors and equipment, increase overall efficiency, and will decrease operating costs for those customers whose rates contain a Power Factor Clause (see current Rates and Tariff Handbook). Where large motors are to be installed, consideration should be given to the use of capacitors to improve the power factor.

VII. CUSTOMER-OWNED TRANSFORMER

1. Where a customer is to receive primary metered service and the transformers and protective equipment are customer owned; such transformers and protective equipment shall comply in all respects with the N.E.C., City specifications and any other applicable standard/regulation. Maintenance and operation are the responsibility of the customer. Please refer any questions to the Electric Engineering Division at (302) 736-7070.

VIII. SUBSTATIONS

1. The City shall always be consulted and shall approve the facilities prior to the completion of the plans. For example, this approval may include the design, location, and construction of customer-owned substations. Any expense related to the interconnection of the substation shall be borne by the substation owner.

IX. SENSITIVE ELECTRONIC EQUIPMENT

1. Sensitive electronic equipment (computers, industrial process controller, etc.) should be protected from electrical noise, power surges, and related disturbances through the customer installed equipment. Refer to Section XIV, page 23 for more information on liability and responsibility.

X. PRIMARY CUSTOMER

1. A primary customer is one who owns and maintains all primary cables, wires, transformer(s), secondary cables, and all associated equipment on the load side of the metering point. The City will provide and install all metering equipment at the customer's expense. The exact location will be determined by the City.

   a. **Overhead:** The metering installation will be located at or near the property line (metering point). The point of attachment (demarcation point) is defined as the load side of CT; the City will make this connection.

   b. **Underground:** The metering installation will be located on a riser pole, or underground metering cabinet, at or near the customer's property line (metering point). The City shall determine the type of installation. On pole mounted metering installations, the point of attachment (demarcation point) is defined as the load side of CT and the City will make this connection. On underground, the point of attachment (demarcation point) will be the elbow inserts and the customer will install and terminate the customer owned cables.

XI. TEMPORARY ELECTRIC SERVICE

1. Temporary installations, metering, and/or other services of short duration shall be made at the expense of the customer with charges based on the materials, labor, and equipment required to install and remove the City supplied electrical equipment. A deposit in advance, sufficient to cover estimated construction and removal expenses and energy used, may be required.

   a. A temporary service is ordinarily not recurrent in nature, and is required for temporary structures or locations for a period of normally less than one year, such as a construction trailer, event lighting, etc.

   b. A temporary service will be rendered only when and where the City has the necessary facilities available to render the service applied for, without detriment to the service of other customers.

   c. If extensions are required by the City, a credit will be issued for material returned in first class, usable condition as determined by the City.

   d. All temporary service locations will be determined by a City representative.

   e. No temporary service installation shall be moved while the City's service is attached.

   f. Service wire, meters and all other City equipment associated with the temporary service will not be connected or disconnected by persons other than employees of the City.

g. A State of Delaware electrical inspection shall be required prior to the City energizing the service.

h. All equipment, except the meter, shall be furnished and installed by the customer/contractor.

2. **OVERHEAD TEMPORARY SERVICE**

a. A pole or timber to which the City attaches a temporary overhead service for supplying a service shall be supplied and erected by the customer/contractor and shall meet the City's minimum requirements as outlined below.

i. If the City's service will cross a public street or highway, the support must be a treated pole of Class 6 or larger (Class 6 pole has a minimum circumference around the top of 17 inches) and meet minimum road clearances as required by the N.E.C., Article 230-II and N.E.S.C, Section 23. If the service will not cross a public street or highway, the support may be either a treated pole or timber. If a timber is used it shall be structural grade fir or pine with a cross section not less than nominal 6 inches x 6 inches. Three (3) 2 x 6's are acceptable. The service shall meet the minimum height requirements as per N.E.C., Article 230-II.

ii. The pole or timber shall have inherent strength or be adequately guyed to support the service conductor. Braces at a minimum, are to be 2-inch x 4-inch lumber well spiked to the pole or timber at least ten (10) feet above ground and two solidly driven 2-inch x 4-inch stakes.

iii. Temporary services will normally be three-wire, 120/240 volts and limited to one span not more than 100 feet provided proper clearance can be maintained.

3. **UNDERGROUND TEMPORARY SERVICE**

a. When a customer requires a temporary service from an underground distribution system, the pole or timber with service equipment, shall be installed by the customer/contractor and shall meet the requirements in Sections 1 thru 6 below.

i. The support shall be a treated pole or structural timber with a cross section of not less than (nominal) 4" x 6" or 2" x 12".

ii. The pole or timber must be of sufficient length to be installed in the ground far enough to make the support sturdy against accidental damage-approximately 30 inches in depth.

iii. The pole or timber must be at a location specified or approved by the City and will normally be located from five (5) to ten (10) feet from an existing pad mounted transformer, secondary pedestal, or splice box.

iv. The contractor will provide conduit down the pole or timber from the meter socket to a distance approximately eight (8) inches below grade and enough underground cable to reach the City's transformer or splice box. The contractor must dig the trench from the support to within three (3) feet of the City's facility at a minimum depth of 24 inches, see N.E.S.C. Section 35, Rule 352 and/or N.E.C. Table 300.5.

v. Underground conductors shall have sufficient length to make connections to terminals in the secondary compartment of the transformer or pedestal. Minimum cable size will be #2 Aluminum. Temporary services will normally be three-wire, 120/240 volts.

vi. If 3-phase temporary service is requested and approved, the owner/developer shall supply and install all conduits per City design and standards and will be responsible to pick up and install all below grade equipment, pads, and pedestals per the City specifications from the City warehouse. The owner/developer will be responsible for 100% (including current warehouse overhead rate) of the material/equipment cost as quoted in the primary extension fee; however, the City will continue to own and maintain this equipment. The City will not accept or install any materials supplied by the contractor or customer. The cost of the 3-phase pad mounted transformer will be prorated for the duration of time temporary service is requested. Additional costs will be incurred if duration of time temporary service requested is exceeded. NO refunds will be issued is temporary service is removed prior to expiration of requested duration of time.

XII. RIGHTS-OF-WAY

1. Any applicant requesting electric service agrees to furnish, without expense to the City, a satisfactory right-of-way necessary for the erection, maintenance, and operation of electric facilities, including the right to trim trees, bush or shrubs, or clear undergrowth as deemed necessary by the City. This right-of-way includes cables and equipment that may be installed for the service of contiguous or noncontiguous properties. The right-of-way shall remain in effect until the City agrees to abandon the right-of-way.

XIII. ACCESS

1. City employees have the right to enter onto the property at any time to inspect or repair the electric facilities; determine electric loads, and metering equipment. No structures or items shall be placed near City equipment to hinder opening of doors and safe access to the equipment. All vegetation must be kept trimmed to allow safe access to City equipment to include meters. The clearance requirements will be 10 feet where access to the internals of the equipment is made and 3 feet on all other sides of the equipment. The property owner will be responsible to remove any obstructions at their expense or, if not available to remove the obstructions, the City will remove the obstructions at the expense of the property owner.

XIV. CONTINUITY OF ELECTRIC SERVICE LIABILITY AND NOTICE

1. **CITY LIABILITY**. The City does not guarantee continuous and uninterrupted electric service and shall not be liable for any loss, cost, damage, or expense to any customer occasioned by any interruption, phase reversal or phase loss if due to any cause beyond the reasonable control of the City.

2. **CITY LIABILITY LIMITED**. The City shall not be liable for damages resulting from the presence of electric energy on the customer's premises, or from the use of the City electric service by the customer.

3. **CUSTOMER LIABLE FOR ELECTRIC WIRE AND APPLIANCE DAMAGE TO PERSONS AND PROPERTY**. The City assumes no responsibility for any damage done by, or resulting from, any defect in the electric wiring, apparatus, fixtures, or

appliances of the customer. If any loss or damage to City property or any accident or injury to persons or property is caused by or results from the negligence or wrongful act of the customer, their agents or employees, the cost of the necessary repairs to, or replacement of City property shall be paid by the customer to the City and any liability otherwise resulting shall be assumed by the customer.

4. **NOTICE OF TROUBLE**. The customer shall promptly notify the City of any defect in electric service or of any trouble or irregularity to the electric supply. This can be done by contacting Customer Service at (302) 736-7035 or System Operations at (302) 736-7086, option 3. Contact System Operations for any interruptions in service occurring after normal customer Service business hours.

5. **PRE-ARRANGED INTERRUPTION OF SERVICE**. Whenever electric service is interrupted for work on lines or equipment, the work shall be done, as far as practicable, at a time that shall cause the least inconvenience to the customer. The customer to be affected by the interruption shall, if practicable, be notified in advance. If customers are unresponsive to attempts to schedule required outages, the City will proceed with the work at its convenience.

6. **ELECTRIC FLUCTUATIONS; REMEDIES**. Electric service shall not be used by the customer in a manner which shall cause unusual fluctuations or disturbances in the City's electric supply system. Should fluctuation or disturbance be caused by the customer, the City may discontinue the electric service and require the customer to modify the installation or install approved controlling devices, or both.

7. **DUTY TO REPAIR OR REMOVE COMMUNICATION INTERFERENCE DEVICE.** It shall be unlawful and a nuisance for any person to operate any motor or other electrical device which shall cause interference with communication reception more than ten (10) days after receiving notice from the City Manager, or designee, of the interference.

8. **RESALE OF ELECTRICITY PROHIBITED.** The customer shall not directly or indirectly sell, sublet, assign, or otherwise dispose of any electric energy without the written consent of the City Manager or designee. Purchase of electric energy in bulk for use by tenants located on the customer's property, when the energy cost is included in the normal rental charge or occupancy of the premises, shall not be considered resale.

9. **ELECTRIC USE LIMITED TO CONTRACT PLACE AND PURPOSE**. The City's electric service shall not be used for any purpose or in any place other than that stipulated in the customer's contract for electric service, except as written consent of the City Manager, Electric Director, or designee.

XV. CITY'S RIGHT TO DISCONTINUE ELECTRIC SERVICE AND NOTICES

1. The City reserves the right to discontinue electric service without notice for the following reasons:

   a. **Without Notice**. The City may discontinue electric service without notice for the following reasons:

      I. Fraud or Abuse. To protect the City from fraud or abuse.

      II. Canceled Electric Contracts. Upon the cancellation of electric service agreements.

      III. Overloading conditions of the City owned transmission/distribution network or other emergencies.

b. **With Notice for Failure to Repair, Violation of Article, or Non-payment**. The City may discontinue service to a customer upon a determination by the City Manager, or designee, that the Notice of Termination is correct or that the customer has waived his right to dispute the Notice of Termination for the following reasons.

i. Failure to repair conditions having a detrimental effect on the City electric system or safety of the customer or public.

ii. For violation or noncompliance with this Electric service handbook, Federal, State, or Local rules and regulations, the appropriate service classification, or an electric service contract.

iii. The City may discontinue service to a customer for nonpayment upon a determination by the City Manager, or designee, following the regulation as adopted by the City which may follow the guidelines as adopted by the Public Service commission of the State of Delaware.

XVI. SUSPENSION OF ELECTRIC SERVICE CONTRACT

1. If, by reason of any act, neglect or default of a customer, the City's electric service is suspended or the City is prevented from supplying electric service in accordance with the terms of any electric service contract it shall have entered, the minimum charge for the unexpired portion of the electric service contract term shall become due and payable immediately as liquidated damages in lieu of the anticipated returns from the electric contract.

XVII. RELOCATION OF ELECTRIC FACILITIES

1. Any alterations, changes, or relocations of the City-owned electric facilities, when requested by the customer, shall be made by the City and the cost paid by the customer and their participation may be required.

2. In the event the City shall be required by any Public Authority, or at the City's discretion, to place underground or relocate any portion of the City's facilities, the City at their expense shall make the necessary changes in the location of the point of delivery.

XVIII. RIGHT TO REMOVE CITY'S EQUIPMENT

1. All meters, instrument transformers or other service equipment supplied by the City shall remain its exclusive property. The City shall have the right to remove all its property from the premises of the customer at any time after the termination of service, regardless of the reason for such termination.

XIX. CITY'S RIGHT TO INSPECT

1. The City shall have the right, but shall not be obliged, to inspect any installation before electricity is provided or at any later time. The City reserves the right to reject any wiring or appliances not in accordance with the City's standard requirements; but such inspection, or failure to inspect, or to reject, shall not render the City liable or responsible for any loss or damage, resulting from defects in the installation, wiring, or appliances, or from violation of City Rules, or from accidents which may occur at the customer premises.

XX. DEFECTIVE INSTALLATIONS

1. If at any time the wiring, fixtures or appliances of the customer are found to be defective or dangerous by a City Representative, service may be refused or discontinued until the customer has the condition corrected. The City's undertaking extends only to the supply of service at the point of delivery. If a private electrician determines the wiring in the structure to be unsafe and they notify the Electric Department, service will be disconnected until repairs are made at the account holder's expense until a valid electrical inspection is completed and a copy is provided to the City.

XXI. SERVICE DISCONNECTED DUE TO FIRE, WATER, STRUCTURAL OR SIMILAR INCIDENT

1. When a meter has been removed from a service by the fire department, first responder, or other authorized parties, the owner must provide an electrical inspection from a State of Delaware electrical inspection agency stating that the service is acceptable for use before the City will reconnect the service. For services outside the City limits, approval to reconnect must also be gained by the appropriate Fire Chief.

SECTION 2

ELECTRIC METERS

1. All electric meters are owned, installed, and maintained by the City. Only City installed sealing/locking devices may be used to secure meter sockets, metering cabinets, transformers, or any City owned equipment. In no case, will a locking device be installed by the customer to prevent access to meter sockets or City owned equipment. The use of jumpers by the customer in the meter socket is forbidden. Unauthorized modification of metering equipment shall result in the issuance of tampering charges to the account holder.

I. CITY RESPONSIBILITY

1. The City is responsible for the supply of a kilowatt hour/KVarH/kw meter, all associated instrument metering equipment, and determining the location of the equipment

II. CUSTOMER RESPONSIBILITY

1. The customer will be responsible for all wire ways, weather heads, disconnects, entrance cable, conductors, meter sockets, enclosures, connectors, conduits, and all associated equipment.

   a. On overhead installations the customer is responsible up to and including the service wire attachment (City's service) weather head, service cable, meter socket, and all associated equipment.

   b. On underground installations the customer is responsible for the conduit, terminal adapter, locknut, bushing, meter socket, and all associated equipment required by COD representative

   c. The customer must allow access to any City employee, or representative, at any and all times, refer to Section XIII, page 23. Lack of access to the meter or the metering equipment may result in the termination of service until access is granted or allowed.

   d. Before any meter can be set at a new or existing location, an address must be displayed at said location.

   e. It is the customers responsibility to ensure all the requirements in the **ELECTRIC METERS** section are completed before requesting the service to be energized. Multiple visits due to incomplete requirements may result in a $50.00 service charge.

III. ELECTRIC SERVICE CONTRACT

1. An application form must be completed and approved to engage in a contract for service. A service contract is required to receive electric service from the City. This Handbook and any Rules and Regulations adopted by the City shall be part of every contract for electric service and shall govern all classes of service unless otherwise stated by the service classification in the Rates & Tariffs Handbook.

IV. METER LOCATION

1. **ALL METER LOCATIONS MUST BE PRE-APPROVED BY THE CITY.** The preferred location (the City reserves the final determination) for new meter installations will be on the outside of the building and will be at a point that is always accessible and kept free of obstructions, refer to Section 1, paragraph XIII, page 23. The meter must be located on the individual's property and the installation must comply with the N.E.C. Older metering installations that are inside a building or enclosure must be in a clean, well lit, safe, unobstructed location accessible from the outside for meter reading, meter testing, maintenance, and inspection purposes. If the access point is kept locked then codes, combinations, or a minimum of two (2) keys to locks must be provided at the customer's expense (one for the Metering division and one for the Meter Reading division).

V. METER SOCKET REQUIREMENTS

1. All meter sockets will accept blade type meters; bolted type meter sockets are not acceptable. In all cases the meter socket and required metering equipment will be supplied by the applicant

2. Sockets must be installed so that the top of the meter will not be more than six (6) feet nor less than four (4) feet above the finished grade. It will be the responsibility of the contractor/owner to determine finished grade. A minimum horizontal clearance of three (3) feet, a vertical clearance of eight (8) feet and a minimum depth of three (3) feet will be provided in front of the meter socket/enclosure. In no case will the clearances be less than required to fully open doors/covers of meter sockets and/or instrument cabinets.

3. **Group Metering**, the contractor will supply multiple meter socket devices in any combination. However, they must be installed so that the height of the lowest meter centerline cannot be less than 40" and the highest meter centerline cannot be higher than six (6) feet above final grade. The multi- meter devices will be at a location and of a specified type approved by the City Metering Division. The contractor will install the meter mounting devices and underground conduits, or overhead mast if applicable. If access to the base of the metering unit is restricted because of concrete or other covering material, the conduit will be extended to a point outside the covering material at no expense to the City. Individual meters will be clearly labeled with a weatherproof permanent decal. Group metering having services greater than 400-amp self-contained sockets (Class 320) must have a means of disconnect for each individual service. If a House Meter is part of Group Metering, it must contain a lever type bypass.

4. **Residential** service metering sockets will be placed on the side of the house that is nearest to the City supply point. The meter socket will be placed on the front or on the side of the house within ten (10) feet of the front corner of the house. Multi-dwelling homes with individual property ownership shall have the meter installed on the customer's property. When home structure design does not allow for electrical facilities to comply with NEC requirements, individual meter sockets on pedestals may be acceptable with prior approval from the Electric Engineering division. These meter sockets will be provided, installed, and maintained by the customer. The customer will, in all cases, furnish and completely install suitable wiring within the meter socket to permit the City to install the meter without any additional materials other than the meter. Replacement of the meter socket is required if the locking mechanism or if the meter socket is no longer functional or safe.

5. **Small and Medium Commercial** service metering sockets, service size up to 400-amp Wye - 400-amp Delta, single phase or three-phase, will be located on an outside wall agreeable to the City and the customer. These meter sockets must have a minimum Class 200 (200 amp service and below) or Class 320 (200 amp to 400 amp service) and must contain a lever type bypass and will be provided, installed, and maintained by the customer. The customer will, in all cases, furnish and completely install suitable wiring within the meter socket to permit the City to install the meter without any additional materials other than the meter**. Replacement of the meter socket is required if the locking mechanism or if the meter socket is no longer functional or safe.**

6. **Large Commercial** service metering sockets, greater than 400-amp Wye - 400-amp Delta, single phase or three phase, require a CT metering installation. The City will supply all metering equipment (CT's, meter socket, CT cabinet, metering conductor) and the customers will be responsible for this expense. If the metering installation is mounted on the building, the customer will be responsible for the mounting of the meter socket(s), CT cabinet, and installation of any necessary meter conductor conduit will have a disconnect installed at a point before the C.T. Cabinet. An overhead installation may be mounted on a pole located at or near the property line and the City will install all the metering equipment at this point. Metering equipment for underground services will be installed either on the building, on the transformer, or other City approved locations. If C.T. Metering is installed on the transformer, a disconnect must be installed at point before entering structure.

7. On **Primary** Metering services, single phase or three-phase, the City will provide and install the meter socket and the customer will be responsible for this expense.

8. Meter sockets / equipment shall not have any other utilities name or contact information displayed. Decals with such information will need to be removed before a meter is set.

On any existing service where any type of changes are being made to the building, such as but not limited to, renovations, building additions, or a service upgrade or downgrade and if the metering is currently located inside the building, it must be moved to a point outside the building if physically possible. If any type of construction will be erected, concreted, or paved that would enclose or somehow block access to the meter, the meter must be relocated to an accessible location.

VI. 480 VOLT SPECIFICATIONS

1. Due to safety concerns, all new or existing services reassigned to the City for maintenance, will have a disconnect installed at a point before the meter socket or CT Cabinet. If the service is customer owned and there is no disconnecting means to ensure the safety of personnel, an outage must be scheduled to perform work on the meter. It is the owner/customer/ electrician's responsibility to schedule/coordinate the outage with the customers and with the City. The City requests 24 hours' notice when possible to assist with the outage. A disconnect must then be installed before the service is re-energized.

VII. METER SOCKET MOUNTING

1. It is necessary that the meter socket is carefully and rigidly attached to the customer's structure or building also ensuring that it is plumb and level. For safety reasons, this attachment must be maintained by the customer. It is the customer's responsibility to keep the meter socket firmly attached to the mounting surface and if it is not then the customer will coordinate the repair at their expense in a proper time frame or service may be disconnect until repairs are made.

2. Refer to Drawings M1 and M2 on pages 55 & 56 for illustrations referencing meter socket placement.

VIII. METER AND METER SOCKET ACCESSIBILITY

1. See Section 1, paragraph XIII, page 23 for access requirements for City equipment.

IX. METER SOCKET IDENTIFICATION

1. Any building that has more than one meter or pedestal with multiple sockets, the customer/contractor must identify the individual meter sockets. If an existing meter is removed for any reason and the meter socket requires identification, the meter will not be reinstalled until the socket is properly labeled. A weatherproof decal / label type permanent marking must be made both on the inside and outside of the meter socket. A magic marker, piece of tape, sticky notes, pencil marking, etc. are not acceptable for identification. Examples of identifications are as follows: Apt. A, Apt. B, Apt. C; Unit 1, Unit 2, Unit 3; 101, 102, 103; upstairs, downstairs. Meters will not be set unless the permanent marking has been done. The City will decide if the markings on the meters are deemed acceptable. It is not the City's obligation or responsibility to confirm this marking is what it is labeled as. Refer to drawings M1 and M2 in Appendix 1 that illustrates proper placement of meters with measurements and decal & labeling placements.

X. METER TAMPERING

1. **TAMPERING WITH CITY ELECTRIC EQUIPMENT; LIABILITY**.

   a. It is unlawful for any person except a duly authorized representative of the City to make any temporary or permanent connection or disconnection between the electric service load and the City's distribution system. Additionally, it is unlawful to set, change, remove, tamper, or interfere with or make any modifications to the City's meter. The City is not liable for any injury or damage because of this unlawful activity.

   b. If the City's meters or other property are tampered or interfered with, the customer receiving service through that equipment shall pay the amount which the City estimates is due for electric service, but not registered on the City's meter, for any repairs or replacements required, and for changes in the customer's installation that the City may require. See the City of Dover website for a full list of possible monetary fines.

   c. The City may file Criminal or Civil charges against the responsible party and the customer may be subject to arrest for tampering and/or theft of service. Before the service can be re-energized, all repairs must be made with inspections obtained and full payment for all monies owed the City must be made, including any additional

security deposits that may be required. In cases where it cannot be determined who was being supplied, the owner of the property may be held responsible for the tampering/theft.

d. In some instances, the meter seal and customer service entrance equipment may be disconnected only by licensed electrical contractors and only with prior approval from the city by calling 302-736-7070. If approval is not previously obtained, the established service charge will be charged to the contractor for cutting the meter seal and entering the service equipment without permission. Any additional instances may result in loss of City licensing and/or arrest for tampering.

XI. INACTIVE METERS/METERS REMOVED FOR CAUSE

1. Meters will be removed after being inactive for six (6) months. All services that have been de-energized for more than six months will be inspected by a State of Delaware recognized electrical inspection agency prior to re-energizing.

XII. TERMINATION WITH NOTICE

1. When a condition is discovered by the City that is in violation of the articles contained in this Handbook, the customer will be notified in writing allowing him/her a reasonable amount of time to correct the condition. Some, but not all, of these conditions can include a loose meter socket, a rusted meter socket, an unattached entrance cable, nonfunctional locking mechanism, or any condition that exists whereby the customer can safely receive electric service.

XIII. TERMINATION WITHOUT NOTICE

1. When a condition is discovered by the City that in its opinion is unsafe/hazardous to people or property, electric service will be terminated without prior notice until the hazard is corrected. Examples of these hazards can include: a broken or cracked lug in the meter socket, evidence of arcing, frayed wiring or damage to electrical apparatus owned by the customer.

XIV. METER TESTING

1. Should a customer desire to have their meter tested and the meter is found to be correct within established tolerance as identified in this Handbook, the customer will be charged the established service fee.

XV. METER ADJUSTMENTS

1. A billing adjustment will be made when any of the following condition(s) exists:

   a. A meter is tested and found to be more than four (4) percent fast/slow

      i. A meter that tests fast – the City will either credit or refund the customer any amount equal to the excess kWh usage for a period not to exceed the three (3) previous monthly billing periods unless the time at which the error first developed or occurred can be definitively identified. In this case, the estimated kWh

overcharged will be based on that date but will in no case be retroactive beyond a twelve (12) month period. In cases of a demand meter, kW will be adjusted in the same manner.

ii. For a meter that tests slow – the customer may be charged any amount equal to the under-registered kWh usage for a period not to exceed the three (3) previous monthly billing periods unless the time at which the error first developed or occurred can be definitively identified. In this case, the estimated kWh under-charged will be based on that date but will in no case be retroactive beyond a twelve (12) month period. In cases of a demand meter, kW will be adjusted in the same manner.

b. Stopped/jammed meter – for stopped meters, jammed registers or non-functioning electronic meters, the customer's consumption will be estimated based on the customer's usage during similar periods. The estimate will cover only the period subsequent to the last recorded meter consumption.

c. Meter tampering and/or theft of service – the usage will be based on the recorded registration of the meter if it is determined that all illegal usage went through the meter. If the usage was not recorded through the meter, the usage will be estimated based on the consumption during similar periods. In cases that only part of the kWh usage passed through the meter, both metered and estimated usages will be used to calculate the total kWh.

d. Unauthorized overload – usages for unauthorized overloads will be for kWh/kW calculated on the equipment connected to the service. The cost of any City equipment damaged and personnel expenses to repair the installation will be billed to the customer. An additional charge may be assessed to upgrade the installation.

e. Inactive phase(s) polyphase meter – when a polyphase meter has been operating with an inactive element(s), failures that could be caused from lightning, failure, tampering, unauthorized overload, or other type damage, and has not registered the full consumption for any or all kWh/KVarH/kW, the City will estimate the usage for the unregistered energy. Back billing will be for a period not to exceed the three (3) previous monthly billing cycles unless the time at which the error first developed or occurred can be definitely identified. In this case, the estimated kWh/KVarH/kW undercharge will be based on that date but will in no case be retroactive beyond a twelve (12) month period unless the point of failure outside the twelve (12) month period can be clearly identified.

XVI. CHANGE OF INSTALLATION

1. The customer will give immediate written notice to the City of any proposed substantial increase or decrease in, or change of purpose or location of the customer's installation. The service connection, transformers, meters, and equipment supplied by the City for each customer has a maximum capacity and no additions to the equipment or load connected will be permitted except with the written consent of the City. Failure to give notice to additions or changes in load or location will render the customer liable for any damage to the City's equipment.

XVII. FEES/CHARGES

1. Primary fees and charges associated with extensions and connections are due in full upon receipt unless other payment arrangements have been made. Connection to City service will not occur until payments have been made.

XVIII. INSPECTIONS AND ENTERING PRIVATE PROPERTY

1. The City Manager, Building Inspectors, City employees, or their authorized representatives, shall have access to the customer electric facilities for the purpose of inspecting, removing, repairing or changing any City property situated therein at all times.

XIX. RIGHT TO REMOVE CITY'S EQUIPMENT

1. All electrical equipment maintained by the City will remain its exclusive property. The City shall have the right to remove all its property from the premises of the customer at any time after the termination of service regardless of the reason for the termination.

SECTION 3

TECHNICAL CONSIDERATIONS COVERING PARALLEL OPERATIONS OF CUSTOMER OWNED GENERATION OF 500 KILOWATTS OR LESS AND INTERCONNECTED WITH THE CITY OF DOVER DELIVERY SYSTEM

1. Prerequisite – The customer must be in compliance with the tariff rules and regulations and the applicable tariff classification and rates. The terms and conditions contained herein are in addition to, but do not modify nor negate, the terms of the tariff.

I. PURPOSE

1. This section was developed to clearly state the terms and conditions that govern the interconnection and parallel operation of on-site distributed generation, in order to:

   a. Establish technical requirements which will promote the safe and reliable parallel operation of distributed generation resources.
   b. Enhance the reliability of electric service.
   c. Facilitate the implementation and use of distributed resources technologies.
   d. Enhance economic efficiency in the production and consumption of electricity and other energy; and
   e. Promote the use of distributed resources to provide electric system benefits during periods of capacity constraint.

II. APPLICABILITY

1. Unless otherwise provided, these guidelines apply to all customer generation operating below 501 kilowatts which is interconnected at 12.47kV or below and operated in parallel with the City's power delivery system.

III. INTERCONNECTION APPLICATION

1. A proposed Generator Owner will make a formal application to the City for the interconnection of a generator to the City system. The application will be made on an Application Form provided by the City.

2. The steps to gain approval for an interconnection are as follows:

   a. Verification of consumption history of customer applying to ensure the system size does not exceed limits.
      i. The customer may obtain 12 months of billing on the City of Dover Customer Service website and the other 12 months of data can be obtained by contacting the appropriate point of contact on the Interconnection Application form
      ii. If the consumption history request is by a third party organization then a City of Dover Release form signed by the account owner must be provided.

   b. Submit the following to the appropriate point of contact for Permission to Install:

i. Interconnection Application signed by applicant and send to the email address listed on page 4 of the application.
ii. One-line diagram showing disconnect by electric meter
iii. Specifications sheet for solar panels
iv. Specifications sheet for inverter
v. Yearly estimation of PV Watts produced based on system design/location
vi. Solar Shading Report
vii. Copy of executed contract

c. Once installed please provide the following for Permission to Operate:
   i. City of Dover Generator Interconnection Application, Single Meter Application Part II signed by applicant and Electrical Inspector (if no inspection certificate is available) and send to the email address listed on page 9 of the application.
   ii. Copy of electrical inspection (unless form signed by Electrical Inspector)

IV. DESIGNATION OF CITY CONTACT PERSONS FOR MATTERS RELATING TO DISTRIBUTED GENERATION INTERCONNECTION

1. The City's Electric Engineering Division will be the designated point of contact for all matters related to interconnected generation. The City will maintain records concerning applications received for interconnection and parallel operation of distributed generation. Such records will include the date of receipt of each such application, documents generated while processing such applications, correspondence regarding such applications and the final disposition of such application. Refer to the current Interconnection Application for where to send applications.

V. PRE-INTERCONNECTION STUDIES

1. In many instances the City will wish to conduct a service study, coordination study, or facilities impact study prior to interconnection of a distributed generation unit. In instances where such studies are deemed necessary the scope of such studies shall be based on the characteristics of the distributed generation unit to be interconnected and the proposed point of interconnection.

   a. **Completion of Pre-Interconnection Study –** Upon completion of the interconnection study, the City will notify the Generator Owner that his application has been approved or denied, if denied sufficient details will be provided on why the application cannot be approved. In no event shall the interconnection study take longer than 4 weeks to complete (after receipt of signed customer application and customer submittal of all required data).

   b. **Pre-interconnection Study Fee –** The City will do a pre-interconnection study without charge for the typical and customary installation. If the cost to the City is expected to exceed this typical and customary amount, or if multiple submittals by the Generator Owner are necessary, the City will advise the Generator Owner of the expected cost of such study work by the City before such work begins. The Generator Owner will be responsible for payment of all costs above the typical and customary amount.

VI. NETWORK INTERCONNECTION OF DISTRIBUTED GENERATION

1. Where generation is to be connected to a network system and capable of exporting power to the Grid, the interconnection study may result in more stringent interconnection requirements. This would be applicable to larger systems in Farm or Commercial applications.

VII. PRE-APPROVAL OF GENERATION UNITS, DEVICES AND SYSTEMS

1. Upon approval by the City that certain generating unit's protective devices and/or system(s) meet the standards set out in these guidelines, such approval shall be made available to the appropriate manufacturer upon written request. For subsequent applications using some or all of the identical generating unit's protective devices and/or systems, the manufacturer may submit a copy of the approval with the application as proof that its equipment has already been approved for use on the City's system. Use of pre-approved equipment will not eliminate any applicable requirement for a pre-interconnection study to determine the suitability of the equipment for each application, given the unique arrangements and characteristics of both the Generator Owner and City systems at the point of the interconnection.

VIII. CONNECTION APPROVAL

1. The Generator Owner can connect their generation to the City system only after the Interconnection Application has been approved and the Generation Owner has received approval notification. The City will provide notification within four weeks after the receipt of the Interconnection Application and all required data. Once Permission to Operate is provided, the customer may operate the system. Activation of the system prior to receiving the Permission to Operate may result in double charging of the customer for electricity due to the meter not being able to determine bi-directional flow. Any additional charges resulting from this early operation will not be reimbursable to the customer.

IX. INTERCONNECTED GENERATION SITE WARNING LABEL

1. The Generator Owner will install a warning label in a conspicuous place on their electric meter or meter box to notify the City personnel that there is a generator source installed on the load side of the meter. The warning label shall not be placed in a location that would not interfere with the ability of City personnel to read the electric meter. The City will install a warning label on the Generator Owner's equipment. The warning label must be placed before the requestor will receive the Permission to Operate.

X. DISCONNECTION AND RECONNECTION

1. The City may disconnect a distributed generation unit under the following conditions:

    a. Upon termination of the approved Interconnection Application.

    b. For non-compliance with the technical guidelines specified in this document or other requirements contained in the applicable Customer Tariff, provided that the City has given notice to the Generator Owner and provided the Generator Owner reasonable time (consistent with the condition) to correct such non-compliance. The City will

reconnect the unit only upon receipt of certification from the Generator Owner and verification by the City that the unit is in compliance. The City will provide verification within a reasonable time period.

c. The Generator Owner's generation equipment must be installed and configured so that parallel operation must automatically cease immediately and automatically during outages or loss of the City's electric source in accordance with these guidelines. The Generation Owner must also cease parallel operation upon notification by the City of a system emergency, abnormal condition or in cases where such operation is determined to be unsafe, interferes with the supply of service to other customers or interferes with the City's system maintenance or operation. In addition, the City may disconnect the generator from the system for system emergencies without notice. However, the City will use reasonable efforts to notify the Generation Owner prior to disconnecting.

d. The City may disconnect a Customer/Generation Owner for routine maintenance and repairs on the City's system consistent with applicable tariffs and agreements. The City will make reasonable efforts to provide advance notice to the Customer/Generation Owner of service interruptions resulting from routine maintenance. The City will reconnect the Customer/Generation Owner as quickly as possible under reasonable operations constraints following any such service interruption.

XII. TERMINATION

1. The Generation Owner may terminate the approved Interconnection Application at any time upon thirty (30) days of providing written notice to the City. The City may terminate the Interconnection Application for cause after 60 days written notice to the Generator Owner of a material violation of the terms of the approved Interconnection Application and after the Generator Owner has had a reasonable opportunity to remedy the violation. The Generator Owner must give the City notice that it intends to permanently shut down his generation.

XIII. PRIVILEGED COMMUNICATIONS CONCERNING PROPOSED DISTRIBUTED GENERATION PROJECTS

1. While processing applications for parallel operation and in the conduct of pre-interconnection studies, the Generation Owner shall provide the City with detailed information concerning the proposed distributed generation project. The City shall not use such knowledge of proposed distributed generator projects submitted to it for review to prepare competing proposals to the Generator Owner whereby the City, or its affiliate, offers either discounted rates in return for not installing the distributed generation, or offers competing distributed generation projects. Release of the consumption history to the solar installer will require the completion of the City of Dover Release Form that can be find on the City of Dover Website.

XIV. TECHNICAL GUIDELINES FOR PARALLEL OPERATION OF ON-SITE DISTRIBUTED GENERATION UNITS

1. This subsection describes minimum requirements and procedures for safe and effective connection and operation of distributed generation. A Generator Owner may operate 60 Hertz, three phase or single phase generating equipment, whether a QF or non-QF, in parallel with the City's system pursuant to an approved Interconnection Application provided that the equipment and Generator Owner meet or exceed the requirements of these guidelines and that the

City has approved the Generator Owner's application to interconnect. This subsection describes typical interconnection requirements. Certain specific interconnection locations and conditions may require the installation of additional protective hardware or special protection settings, especially when exporting power to the system. If the City excludes that an application for parallel operation requires additional protective hardware or special protection settings, the City shall make those requirements known to the Generator Owner within 14 days after all pertinent studies are completed.

2. Approval to connect to the City system indicates only that the minimum requirements for a safe proper interconnection have been satisfied. Such approval does not imply that the Generator Owner's facility meets all federal, state and local standards or regulations.

   a. **General Interconnection and Protection Requirements.**

      i. The Generator Owner's generation and interconnection installation must meet all applicable national, state, and local construction and safety codes.

      ii. The Generator Owner's generator shall be equipped with protective hardware and software designed to prevent the generator from energizing one of the City's de-energized circuits. The Generator Owner's generator must automatically disconnect from the City's system if the Grid source is lost, irrespectively of connect loads or other generators.

      iii. The generator shall be equipped with the necessary protective hardware and software designed to prevent sustained parallel operation of the generating equipment with the City's system unless the system service voltage and frequency are within acceptable magnitudes.

      iv. Pre-approved equipment shall be accepted as part of an interconnection proposal without the need to re-review the equipment itself. However, the application, design and setting of pre-approved units and/or equipment must be reviewed and coordinated according to the unique needs of the specific location of the proposed installation. Where a complete unit or system has been pre-approved, only location-specific issues will typically need to be reviewed.

      v. The Generator Owner will be responsible for protecting its own generating and interconnection equipment in such a manner so that City system outages, short circuits, single phasing conditions or other disturbances including zero sequence currents and ferro resonant over-voltages do not damage the Generator Owner's generating equipment. The protective equipment shall also prevent excessive or unnecessary tripping that would adversely affect the City's service reliability to other Generator Owners and Customers.

      vi. The generator and interface protection schemes shall be continuously monitored and functioning, and the generator shall immediately disconnect from the City's system for any condition that would make the protection scheme inoperable.

      vii. The operating power required for the protection and control schemes for the generator and the control power used to disconnect the generator from the City must not be dependent on local City grid power.

viii. Where multiple generators are connected to the system through a single point of common coupling, the sum of the ratings of the generators will be used to determine the applicability of these guidelines. Protection scheme performance with one or more units offline will have to be considered.

ix. Applicable circuit breakers or other interrupting devices at the Generator Owner's facility must be capable of interrupting the maximum available local utility City fault current at the site, including any contribution from the Owner's generator(s).

x. The Generator Owner will furnish and install a manual disconnect device which, when opened, will have the effect of isolating the generator from the City's system. The disconnect device shall have a visible break (a disconnect switch, a draw-out circuit breaker, fuse block, etc. as appropriate to the voltage level), will always be accessible to the City's personnel, and shall be capable of being locked in the open position via a City padlock. The City shall use reasonable efforts to utilize padlocks of a size consistent with typical manufacture's specifications. The Generator Owner shall follow the City's switching, clearance and tagging procedures which the City shall provide and attach the Warning Label noted in Section 3 paragraph IX.

xi. The design, procurement, installation, and maintenance of the equipment at the Generator Owner's site are the responsibility of the Generator Owner and at the Generator Owner's expense.

xii. Any necessary enhancements or improvements needed within the City's system and/or at the customer's site(s) to accommodate the parallel interconnection of the Generator Owner's generation will be at the Generator Owner's expense.

xiii. The Generator Owner has full responsibility and liability for the safe and proper operation of their equipment and the power originating from their generator. The Generator Owner is also responsible for synchronizing their generator(s) with the City's system and maintaining synchronous operation.

xiv. The Generator Owner must immediately cease parallel operation upon notification by the City if such operation is determined to be unsafe, interferes with the supply of service to other customers, or interferes with the City's system maintenance or operation.

xv. The City reserves the right to specify the type of transformer connection (e.g. delta-delta, wye-delta, wye-wye) that will be employed for all multiphase interface transformers consistent, where reasonable, with the Generator Owner's power system.

b. **Prevention of Generator Owner Generation Interference with City System.**

i. To eliminate undesirable interference caused by operation of the Generator Owner's generating equipment, the Generator Owner's generator shall meet the following criteria:

a) **Voltage –** The generating equipment will be operated in such a manner that the voltage levels on the City's system are in the same range as if the generating equipment were not connected to the City's system. The Generator Owner shall provide an automatic method of initiating a disconnect sequence of his generating equipment from the City system with set points noted in the table below.

Generating Systems with Inverters Up to 50kW	Generating Systems with Inverters Greater than 50kW	Non-Inverter or Rotating Machine Generating Systems
• Trip in 0.1 second for V<50% • Trip in 2 second for 50%≤V<88% • Trip in 2 seconds for 106%<V<137% • Trip in 0.03 second for 137%≤V (Above times and voltages taken directly from IEEE 929)	• Trip in 0.1 Second for V <50% • Trip within 0.1 to 30 seconds for 50%≤V<88% • Trip within 0.1 to 30 seconds for 106%<V<137% • Trip in 0.03 second for 137%≤V (Specific voltage and time delay set points will be determined for each installation.)	• Trip in 0.1 second for V < 50% or V ≥115% • Trip within 0.1 to 30 seconds for V>110% or V<90% (Specific voltage and time delay set points will be determined for each installation.)

Note: Trip time refers to the time between when the abnormal voltage condition occurs, and the generator being completely disconnected from the utility City.

On three-phase generator installations, full three phase voltage sensing should be employed. Voltages must be sensed on the high side of any interface transformer if the transformer high voltage winding is ungrounded.

The Generator Owner may reconnect to the grid when the system voltage returns to normal range and is stabilized as defined in Section III, Definitions.

b) **Flicker** – The Generator Owner shall not cause excessive voltage flicker on the City's system. This flicker shall not exceed the "Borderline of Irritation" curve, as defined in IEEE Std 519, Recommended Practices and Requirements for Harmonic Control in Electric Power Systems. Lower levels of flicker may be required in areas where equipment such as computers and instrumentation are impacted.

c) **Frequency** – The operating frequency of the generating equipment shall not deviate more than the values noted in the table below.

Generating Systems with Inverters Up to 50kW	Generating Systems with Inverters Greater than 50kW	Non-Inverter or Rotating Machine Generating Systems
• Trip in 0.1 second for F<59.3 Hz • Trip in 0.1 second for F>60.5 Hz. (Set points taken from IEEE 929 & IEEE 1574)	• Trip in 0.1 second for F<59.3 Hz • Trip in 0.1 second for F>60.5 Hz. (Other frequency and time delay set points may be necessary for a specific installation.)	• Trip in 0.1 second for F<59.3 Hz • Trip in 0.1 second for F>60.5 Hz. (Other frequency and time delay set points may be necessary for a specific installation.)

Note: Trip time refers to the time between when the abnormal frequency condition occurs and the generator being completely disconnected from the utility City.

The Generator Owner may reconnect when the system frequency returns to normal range and is stabilized as defined in Section III, Definitions.

d) **Harmonics –** Non-linear circuit elements such as inverter can produce harmonics. Per IEEE Std 519, Recommended Practices and Requirements for Harmonic Control in Electric Power Systems, Table 11.1, the total harmonic distortion (THD) voltage shall not exceed 5% of the fundamental 60 Hz frequency nor 3% of the fundamental for any individual harmonic as measured at the location where the customer interfaces with the City's system (Point of Common Coupling). In addition, the level of harmonic current that the customer can inject into the City's system shall not exceed that specified in Table 10.3 in IEEE Std 519. Furthermore, any communication notch should be limited as defined by Table 10.2 in IEEE Std 519. The preceding requirements apply to all types of generation systems.

The Generator Owner is responsible for the installation of any necessary controls or hardware to limit the voltage and current harmonics generated by his equipment to defined levels.

e) **Power Factor –** The generator must not adversely impact the power factor of the Generator Owner site. Most inverters are designed to operate close to unity power factor. The operating power factor of the generator shall be contained within the limits defined in the table below. However, to the extent that a Generator Owner's power factor at the Point of Common Coupling falls below 0.95 lagging as a direct result of the installation of the generating unit(s), the Generator Owner must obtain, install and maintain, at his expense, corrective apparatus that compensates for the drop in power factor caused by the installation of the generator. Penalties will be assessed for power factors that fall below 0.95 lagging or leading.

Generating Systems with Inverters Up to 50kW	**Generating Systems with Inverters Greater than 50kW**	**Non-Inverter or Rotating Machine Generating Systems**
0.95 Lagging or Leading when output exceeds 10% of inverter rating. (From IEEE 929 & IEEE 1574)	0.95 Lagging or Leading When output exceeds 10% of inverter rating.	0.95 Lagging or Leading

f) **Current** – In some cases, directional over-current protection may be required to limit fault current flowing onto the Grid in the event of a line fault. DC inverters that are incapable of producing fault current do not require directional over-current protection. Inverter systems should not inject DC current greater than 0.5% of rated inverter output into the AC interface point under either normal or abnormal conditions.

g) **Fault and Line Clearing** – The Generator Owner shall automatically disconnect from the City's system during electrical faults on the City's electrical system and upon loss of the City's electric source. The Generator Owner may reconnect when the system voltage and frequency return to normal range and is stabilized as defined in Section III, Definitions. Detection of the loss of the City's primary electric system, where the Generator Owner is operating in an island with other customer load, becomes increasingly difficult as the level of distributed generation on a feeder approaches the connected load. For generating units 50kW and below, the over/under voltage and over/under frequency settings described previously along with the anti-islanding provisions of IEEE 929/UL 1746 inverters, should be sufficient to satisfy this provision.

C. Automatic Reclosing – The Generator Owner is responsible for protecting his equipment from the effects of switching or automatic reclosing of the City's feeder circuit. The Generator Owner may request the City to delay high speed reclosing on the City's feeder to allow the interconnected generator sufficient time to remove itself from an islanding or de-energized feeder prior to automatic reclose. Since delaying the automatic reclose time degrades the level of service provided to other customers on the circuit, the City will limit the automatic reclose time delays to a few seconds or less. The Generator Owner may also request that a direct transfer trip scheme be added to remove the interconnected Generator from service prior to automatic reclosing by using communications equipment between the generator site and the City. Similarly, the Generation Owner may request that a synchronizing check, or reclose blocking scheme be installed on the City's feeder to prevent out of phase reclosing. The Generation Owner is responsible for all costs associated with the installation and maintenance of these requested **Control, Protection and Safety Equipment Requirements Specific to Generators of 500 kW or less.**

All Generator Owners 500 kW or less can be single phase. Customer owned generators greater than 10 kW must be evaluated by the City to determine if it can be single phase. The following table describes necessary control, protection, and safety equipment specific to generator of 500 kW or less connected to Secondary or Primary Voltage Systems:

Generator Size 500 kW or less

Over-Current Trip	**X**
Over-Voltage Trip	**X**
Under Voltage Trip	**X**
Over/Under Frequency Trip	**X**
Synchronizing Check[2]	**Manual or Automatic**

Notes:

1. Exporting to the City system many require additional operational/protection devices.
2. For synchronous and other type of generators with stand-alone capability.

D. Control, Protection and Safety Requirement Specific to Three Phase Synchronous Generators, Induction Generators, and Inverter Systems.

Generators greater than 50 kW must be three phase generators connected to three phase circuits.

1. **Three Phase Synchronous Generators.** Generator circuit breakers shall be three phase devices with electronic or electromechanical control. The Generation Owner is solely responsible for properly synchronizing his generator with the City's system. For a synchronous generator, the excitation system response ratio shall not be less than 0.5 (five-tenths). The generator's excitation system(s) shall conform, as closely as reasonably achievable, to the field voltage vs. time criteria specified in American National Standards Institute Standard C50.13 in order to permit adequate field forcing during transient conditions.

2. **Three Phase Induction Generators and Inverter Systems.** Induction generation may be connected and brought up to synchronous speed (as an induction motor) if it can be demonstrated that the initial voltage drop measured on the City's side at the point of common coupling is within the visible flicker limits stated inSection 3, paragraph XIV.2.b.i.b. Otherwise, the Generator Owner may be required to install hardware use other techniques to bring voltage fluctuations to acceptable levels. Line-commutated inverters do not require synchronizing equipment. Self-commutated inverters whether of the utility-interactive type or stand-alone type shall be used in parallel with the City system only with synchronizing equipment.

Requirement for the Control, Protection and Safety Equipment[1] Greater than 25kW and Less than 500kW, Three Phase Connected to Primary System

Generator Disconnect Device	**X**
Over-Voltage Trip	**X**
Under Voltage Trip	**X**
Over-Current Trip	**X**
Over/Under Frequency Trip	**X**
Ground Over-Voltage Trip[2] **OR** **Ground Over-Current Trip[2]**	**X**
Synchronizing Check[3]	**Manual or Automatic**
Power Direction[4]	**X**
Transfer Trip/Reclose Blocking[5]	**X**

Notes:

1. Exporting to the City's system may require additional operating/protection devices and will require coordination of operations with the City.
2. Selection depends on grounding system, if required by the City.
3. For synchronous and other types of generators with stand-alone capability.
4. Required only if generator size is greater than Generator Owner's minimum load and thus capable of exporting. The relay will operate if the power flow from the generator into the Grid exceeds a predetermined level. A time delay will have to be incorporated into this relaying scheme to prevent it from operating during synchronous swings.
5. May be required as part of any necessary transfer tripping/reclose blocking protection scheme.

E. Requirements Specific to Generators paralleling for 0.1 second or less (Closed Transition Switching)

Control, Protection and Safety Equipment requirement for generators less than 500 kW which parallel with the City's system for 0.1 second or less such as during source or load transfers.

Over-Voltage Trip	**X**
Under Voltage Trip	**X**
Synchronizing Check[1]	**Manual or Automatic**
Excessive Closed Time Trip[2]	**X**

Notes:

1. For synchronous and other types of generators with stand-alone capability.
2. Scheme will trip generator if closed transition parallel mode remains in effect longer than 0.1 second.

F. Inverter Type – DC Generation installations using inverters for interconnection with the City must use non-islanding type inverters as defined in IEEE 519, Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems, IEEE 929, IEEE Recommended Practices for Utility Interface of Photovoltaic (PV) Systems (including Annex B, D, E & G) and UL Subject 1741, Standard for Static Inverters and Charge Controllers for use in Photovoltaic Power Systems.

G. Inspection and Start-Up Testing – the Generator Owner shall provide the City with reasonable prior notice at least 2 weeks before the initial energizing and start-up testing of the Generator Owner's generating equipment and the City, at its discretion, shall witness the testing of any equipment and protective systems associated with the interconnection. The Generator Owner shall revise and re-submit the application information for any proposed modification that may affect the safe and reliable operation of the City's system. The generator may be reconnected to the City system only after the modified application has been reviewed, testing has been confirmed and the City has given approval to reconnect.

H. Site Testing and Commissioning - Testing of protection systems shall include procedures to functionally test all protective elements of the installation up to and including tripping of the generator and interconnection point. Testing and testing intervals should be in accordance with manufacturers and industry recommendations. Testing will verify all protective set points and relay/breaker trip timing. The City may witness the testing of installed switchgear, protection systems, and generator. The Generator Owner is responsible for all maintenance of the generator, control and protective equipment. The Generator Owner will maintain records of such maintenance activities which the City may review at reasonable times.

I. Metering - Metering requirements will be reviewed on each specific installation.

J. Dedicated Transformer – A dedicated transformer will be required where the generating Generator Owner is served from the same transformer secondary as another City customer and inverter-based technology net meeting IEEE 929 and IEEE 519- specifications is used. In addition, a dedicated transformer or other current-limiting device is needed for any type of generator installation where the increase in available short circuit current could adversely impact other City customers on the same secondary circuit.

K. Suggested References

The following references can supply technical support and insight into the safe, reliable interconnection of distributed generation with the City's systems. These references should be reviewed by those individuals or firms contemplating parallel operation of generation with the City. All references to IEEE, NEC & UL Standards will refer to the latest version of the standards.

IEEE C37.95- - IEEE Guide for Protective Relaying of Utility-Consumer Interconnections

IEEE Std 1001 - IEEE Guide for Interfacing Dispersed Storage and Generation Facilities with Electric Utility Systems

IEEE Std 929 - IEEE Recommended Practices for Utility Interface of Photovoltaic (PV) Systems

IEEE Std 1021 - IEEE Recommended Practices for Utility Interconnection of Small Wind Energy Conversion Systems

IEEE 1574 - Standard Series for Microgrids and Distributed Resources

IEEE Std 519 - IEEE Recommended Practices and Requirements for Harmonic Control In Electrical Power System

NEC 690 - Solar Photovoltaic Systems

UL 1703 - Standard for Safety Flat-Plate Photovoltaic Modules and Panels

UL 1741 - Standards for Static Inverters and Charge Controllers for use in Photovoltaic Power Systems

SECTION 4

NET METERING

I. General Provisions – Net Metering can occur in three circumstances as follows:

1. **Condition 1** – Individual Customer/Single Account/Single Premise where all Net Metering activity occurs at a single customer premise for a single customer account;
2. **Condition 2** – Individual Customer/Multiple Accounts/Single or Multiple Premises where a single customer can aggregate Net Metering for crediting to multiple accounts and/or premises; or
3. **Condition 3** – Host Customer/Multiple Subscribers/Multiple Premises where a Community Energy Facility, either behind the meter of a Subscriber or as a stand-alone facility, provides Net Metering for multiple Subscribers and multiple premises. A Community Energy Facility may include technologies defined under §352(6)(a-h) of Title 26 of the Delaware Code.

    a. **Interconnection Requirements** – Any requirements necessary to permit interconnected operations between the Customer-Generator Facility or Community Energy Facilities and the City, and the costs associated with such requirements, shall be consistent with the requirements contained in this City handbook. The City shall not require eligible net metering customers who meet all applicable safety and performance standards to install excessive controls, perform or pay for unnecessary tests, or purchase excessive liability insurance.

1. A complete interconnection application is required to facilitate a City- directed transmission and distribution analysis, including an evaluation of potential reliability, safety and stability impacts and determination of whether infrastructure upgrades are necessary and appropriate allocation of applicable interconnection costs as outlined in this handbook.

2. The failure by any interconnection customer to comply with these requirements and the requirements in other Sections of this handbook may result in penalties, including monetary assessments, suspension or revocation of the facilities interconnection or other sanctions as determined by the City Manager.

3. Disputes – Any net metering disputes limited to the correct application of this handbook and Net Metering Tariffs shall be resolved by the City Manager or his/her designee.

4. The City shall offer customers the option of net metering if a customer generates electricity at the customer's premises, subject to all the following requirements:

5. The customer: owns and operates; leases and operates; or contracts with a third party that owns and operates the electric generation facility with a capacity that:
    a. Will not exceed 25 kW AC per City meter for residential customers.
    b. Will not exceed 100 kW AC per City meter for farm customers (subject to rules of Delaware Code - Title 26,

§1014(d)(1)b).

c. Will not exceed 500 kW AC per City meter for non-residential customers;
d. Is located on the customer's premises;
    a. Application by a non-residential customer for the installation of any generation system more than 500 kilowatts shall be given due consideration and may require a special contract. The installation will only be accepted by the City if it complies with the requirements below and there is no detrimental impact to the electric system; the City decision will be final;
e. Uses as its primary source of fuel: solar, wind, hydro, a fuel cell, or gas from the anaerobic digestion of organic material;
f. Does not exceed, individually or in the aggregate as a result of other net-metering customers on the same distribution feeder or substation, a maximum renewable generating capacity greater than 1.5 megawatts on a distribution feeder and shall not exceed 15% of the substation transformer capacity rating; and
g. The total generating capacity of all customer-generation using net metering systems served by the City exceeds 8% of the capacity necessary to meet the City's aggregated customer monthly peak demand for a particular year, the City may elect not to provide Net Metering services to additional customers. The City's aggregated customer monthly peak demand shall be the average of the unadjusted five (5) system peaks for the City as determined by Delmarva Power and reported to PJM based on the average of the last three (3) years.
h. Under all conditions, the installation shall be designed to produce no more than 110% of the Host customer's expected aggregate electrical consumption, calculated on the average of the two previous 12 month periods of actual electrical usage at the time of installation of energy generating equipment and subject to the capacity limits specified in Section 4 paragraph I.1 through I.3 of this rule. For new building construction or in instances where less than two previous 12 month periods of actual usage are available, electrical consumption will be estimated at 110% of the consumption of units of similar size and characteristics or previous residents at the same address, at the time of installation of energy generating equipment and subject to the capacity limits specified in Section 4 paragraph I.1 through I.3 of this rule.

II. Metering and Tariff Requirements - Net Metering shall be accomplished using a single bi-directional meter that measures net energy flow during a billing period.

1. A bi-directional meter or meters that monitor the flow of electricity in each direction will be installed at the expense of the customer in the amount not to exceed $200, and the additional metering shall be used only to provide the information necessary to accurately bill or credit the customer pursuant to Paragraph VII & VIII of this Section, or to collect system performance information on the eligible technology for research purposes.

2. For installations where a larger capacity meter is required to serve the customer, or a larger capacity meter is requested by the customer, the customer shall pay the City the difference in cost between the larger capacity meter and the meter normally provided under the customer's service classification. If an additional meter or meters are installed, the net energy metering calculation shall yield a result identical to that of a single meter.

3. If the existing electrical meter of a customer is incapable of measuring the flow of electricity in two directions through no fault of the customer, the customer shall be responsible for up to $200 of expenses involved in purchasing and installing such a meter. For periods of inaccurate readings, estimations of the usage and returned consumption will be used. If it is deemed the meter has been tampered with, additional fees may be applied to the customer to include materials and labor to repair damage.

4. For Condition 3 where a stand-alone Community Energy Facility is installed, the City shall install the meter necessary to provide the data to accomplish the necessary billing and the customer shall be responsible for up to $200 of expenses involved in purchasing and installing such a meter. The City shall assess the stand-alone Community Energy Facility a customer charge equivalent to the load and energy output characteristics of the generating facility which would be equivalent to the load and energy characteristics of a similarly situated customer in its tariff.

5. City shall provide net-metered customers electric service at non-discriminatory rates that are identical, with respect to rate structure and monthly charges, to the rates that a customer who is not Net Metering would be charged. City shall not charge a Net Metering customer any stand-by fees or similar charges.

6. The Subscribers participating in a Community Energy Facility shall retain ownership of all RECs associated with electric energy produced from all eligible energy resources of the Community Energy Facility unless the Subscribers participating in the Community Energy Facility have relinquished such ownership of RECs by contractual agreement with a third party.

7. If a Net Metering customer terminates its service with the City, the City shall treat the end of service period as if it were the end of the Annualized Billing Period and any excess kWh credits will revert to the city.

III. Net Metering Condition 1 and Condition 2 - If, during any billing period, a Customer-Generator Facility produces more energy than that consumed by the Condition 1 customer, or aggregate total kWh of the Condition 2 customer, the City will credit the customer in kWh's equal to the sum of delivery service charges and supply service charges for residential customers and the sum of the delivery service charges and supply service charges for non-residential customers for any excess energy production of their Customer-Generator Facility that exceeds the customer's on-site, or aggregate total consumption of kWh in the applicable billing period.

1. Excess kWh credits shall be credited to subsequent billing periods to offset a customer's consumption in those billing periods until all credits are used. During any subsequent billing period prior to the end of the Annualized Billing period, the crediting of excess energy kWh will result in the reduction of cost paid by the customer for the kWh of delivery service charges, if applicable, and supply service charges.

2. Any excess kWh credits shall not reduce any fixed monthly customer charges imposed by the City such as Demand, Customer or Power Factor Adjustment charges.

3. The customer shall retain ownership of all RECs associated with electric energy produced from all eligible energy

resources of the Customer-Generator Facility and consumed by the customer unless the customer has relinquished such ownership of the RECs by contractual agreement with a third party.

4. Where applicable, the requirements established in Section VIII of these rules shall apply to the previous Section.

IV. Net Metering Condition 2 – Subject to the applicable Net Metering provisions of Section Four, paragraph III, one customer may have multiple meters under the same account or different accounts, regardless of the physical location and rate class. The customer may aggregate meters for the purpose of net metering regardless of which individual meter receives energy from a Customer-Generator Facility, provided that:

1. City shall only allow meter aggregation for customer accounts for which it provides electric supply service; and

2. The Customer-Generator Facility is designed to produce no more than 110% of the aggregate electrical consumption of the customer's individual meters or accounts that the customer is entitled to aggregate under this Section VIII calculated on the average of the two previous 12 month periods of actual electrical usage. For new building construction or in instances where less than two previous 12 month periods of actual usage are available, electrical consumption will be estimated at 110% of the consumption of units of similar size and characteristics at the time of installation of energy generating equipment; and

3. A Customer-Generator Facility shall not exceed the sum total of the capacity limits among the participants of a Customer-Generator Facility as defined under Section I.5.a-h of this rule; and

4. At least ninety (90) days before a customer commences construction of a Customer-Generator Facility or a customer is entitled to aggregate multiple meters, the customer shall file with the City the following information:

   a. a list of individual meters the customer is entitled to aggregate, identified by address, rate schedule, and account number; and

   b. a description of the Customer-Generator Facility, including the facility's location, capacity, and fuel type or generating technology.

5. The customer may change its list of aggregated meters specified in Section Four, paragraph VIII.4. a no more than once annually by providing ninety days' written notice; and

6. Credit shall be applied to the meter through which the Customer-Generator Facility supplies electricity; and

7. Credit in kilowatt-hours (kWh) shall be valued according to Section Four, paragraph VIII.1 - 4 of this rule and each account's rate schedule as specified in Section Four, paragraph VIII.4.a; and

8. The City may require that customer's aggregated meters specified in Section Four, paragraph VIII.4.a be read on the

same billing cycle.

V. **Net Metering Condition 3, Host System** – Where the Community Energy Facility is located behind the meter of a Subscriber that is also the Host customer, the following will also be subject to the requirements established in Section XI of this Rule:

1. During a monthly billing period where the energy from the Community Energy Facility exceeds the consumption of the Host customer, the Subscribers participating in a Community Energy Facility shall be credited kWh equal to Supply Service Charges – as per the Net Energy Metering Tariff –for any of the energy production more than the consumption of the Host customer of the Community Energy Facility. This credit will only be given to the Host customer monthly; it will be the responsibility of the Host customer to distribute the value of this credit to other Subscribers participating in the Community Energy Facility. Only for the purposes under this section will this not be considered "resale" of electricity but will be considered distribution of dividends for a Community Energy Facility.

2. A Community Energy Facility shall not exceed the sum total of the capacity limits as defined under Section I.5.a- of this rule among the Subscribers of a Community Energy Facility.

3. Where applicable, the requirements established in Section IX of these Rules shall apply to this Section.

4. The City invoked its authority under Title 26, Chapter 10, Subchapter §1014 (e) (3) to credit the energy produced at the value of the Supply Service Charges as defined in the Net Energy Metering Tariff. This Tariff will be updated on an annual basis to reflect the annual budgeted value and will not be trued up at the end of the annual period to reflect actual costs.

VI. **Net Metering Condition 3, Stand Alone System** – Where the Community Energy Facility is a stand-alone facility, the facility will be subject to the requirements established in Section Four, paragraph 2IX. For clarification, the payment will be made to the participant that has the electric meter of the Community Energy Facility in their name.

VII. **Net Metering Condition 3 Subscribers** – Subscribers are eligible to participate in a Community Energy Facility, provided:

1. A community includes customers sharing a unique set of interests; and

2. The City shall only allow meter aggregation for customer accounts of which it provides electric service; and

3. The Community Energy Facility is designed to produce no more than 110% of the community's aggregate electrical consumption of its individual customers, calculated on the average of the two previous 12 month periods of actual electrical usage. For new building construction or in instances where less than two previous 12 month periods of actual usage is available, electrical consumption will be estimated at 110% of the consumption of units of similar size and characteristics at the time of installation of energy generating equipment; and

4. The Community Energy Facility shall not exceed the sum total of the capacity limits among the participants of a Community Energy Facility as defined under Section I.5.a of this rule; and

5. Before Net Metering for a Community Energy Facility may be formed and served by the City, the community proposing a Community Energy Facility shall file with the City the following information:

    a. a list of individual meters the community is entitled to aggregate identified by name, address, rate schedule, and account number; and

    b. a description of the Community Energy Facility, including the facility's physical location, the Host customer's physical location, capacity, and fuel type or generating technology.

6. A community proposing a Community Energy Facility may change its list of aggregated meters as specified in paragraph VII.5.a above no more than quarterly by providing ninety days' written notice to the City; and

7. If the community proposing a Community Energy Facility removes individual customers from the list of aggregated meters as specified in paragraph VII.5.a above, then that community shall either replace the removed customers, reduce the generating capacity of the Community Energy Facility to remain compliant with the provisions provided under paragraphs VII.3 and VII.4 above, or negotiate with the City to establish a mutually acceptable agreement for any excess kWh credit; and

8. The City may require that customers participating in a Community Energy Facility have their meters read on the same billing cycle; and

9. Neither customers nor owners of community-owned energy generating facilities shall be subject to regulation as either public utilities or an Electric Supplier.

10. The Subscribers participating in a Community Energy Facility shall retain ownership of all RECs associated with electric energy produced from all eligible energy resources of the Community Energy Facility unless the Subscribers participating in the Community Energy Facility have relinquished such ownership by contractual agreement with a third party.

11. The Community Energy Facility will also be subject to the requirements of paragraph VII.10. of this rule.

VIII. Net Energy Metering

1. AVAILABILITY
    a. This rider is available to customers served under the following service classifications, Residential "R", Small Commercial "C and C1", Medium Commercial "C2 and C3", Large Commercial "C5", Primary "P", and

Transmission “T” that own and operate an electric generation facility on the customer’s premises that produces electricity from Eligible Energy Resources to offset part or all the customer’s electricity requirements.

2. CONNECTION TO THE CITY’S SYSTEM
   a. The customer or Community-owned electric generation facility cannot be connected to the City’s system unless it meets all applicable safety and performance standards set forth by the following: The City Technical Considerations Covering Parallel Operations of customer Owned Generation of 500 kW or less, National Electric Code, the Institute of Electrical and Electronic Engineers, Underwriters Laboratories, and the City Electric Service Handbook (Handbook). The customer must, at his/her expense, obtain a all necessary permits, inspections, and approvals required by any local public authorities and any other governing regulations in effect at that time.

3. DELIVERED VOLTAGE
   a. The delivered voltage and delivery point of the customer’s electric generation shall be at the same delivered voltage and delivery point that would be supplied by the City to the customer if the customer purchased all of its electricity from the City.

4. RATE
   a. The monthly billing shall be as stated in the applicable rate tariff. Under this rider, only the kWh charge for electricity delivered by the customer is affected. The customer will pay for all kWh delivered by the City. Credit for kWh will be valued according to the latest rates associated with the classification of service.

5. RULES AND REGULATIONS
   a. The General Rules and Regulations of the City for electric service shall apply to service rendered under this service classification. All minimum billings, charges for kWh, kW, Purchased Power Adjustment, Public Utility Tax, Renewal Energy Charge, etc. will be covered under the applicable rate tariff.

IX. DEFINITIONS

1. **Annualized Billing Period** means a period of 12 consecutive monthly billing periods. A customer's first Annualized Billing Period begins on the first day of the first full monthly billing period after which the Customer-Generator Facility is interconnected with the City and is generating electricity. A customer may elect to change the end of the Annualized Billing Period one time.
2. **Community Energy Facility** means a renewable energy generating facility that has Subscribers who share the energy production of the Community Energy Facility, which may be located either as a stand-alone facility or behind the meter of a Subscriber. The Community-owned energy generating facility shall be interconnected to the distribution system and operated in parallel with an electric distribution City’s transmission and distribution facilities. The Community Energy Facility shall:
   a. Satisfy all applicable requirements of Chapter 4, Net Metering of this Rule;

b. Meet all applicable safety and performance standards established by the National Electrical Code, the Institute of Electrical and Electronic Engineers, and Underwriters Laboratories to ensure that net metering customers meet applicable safety and performance standards; and
c. Comply with the City's interconnection tariffs and operating guidelines.

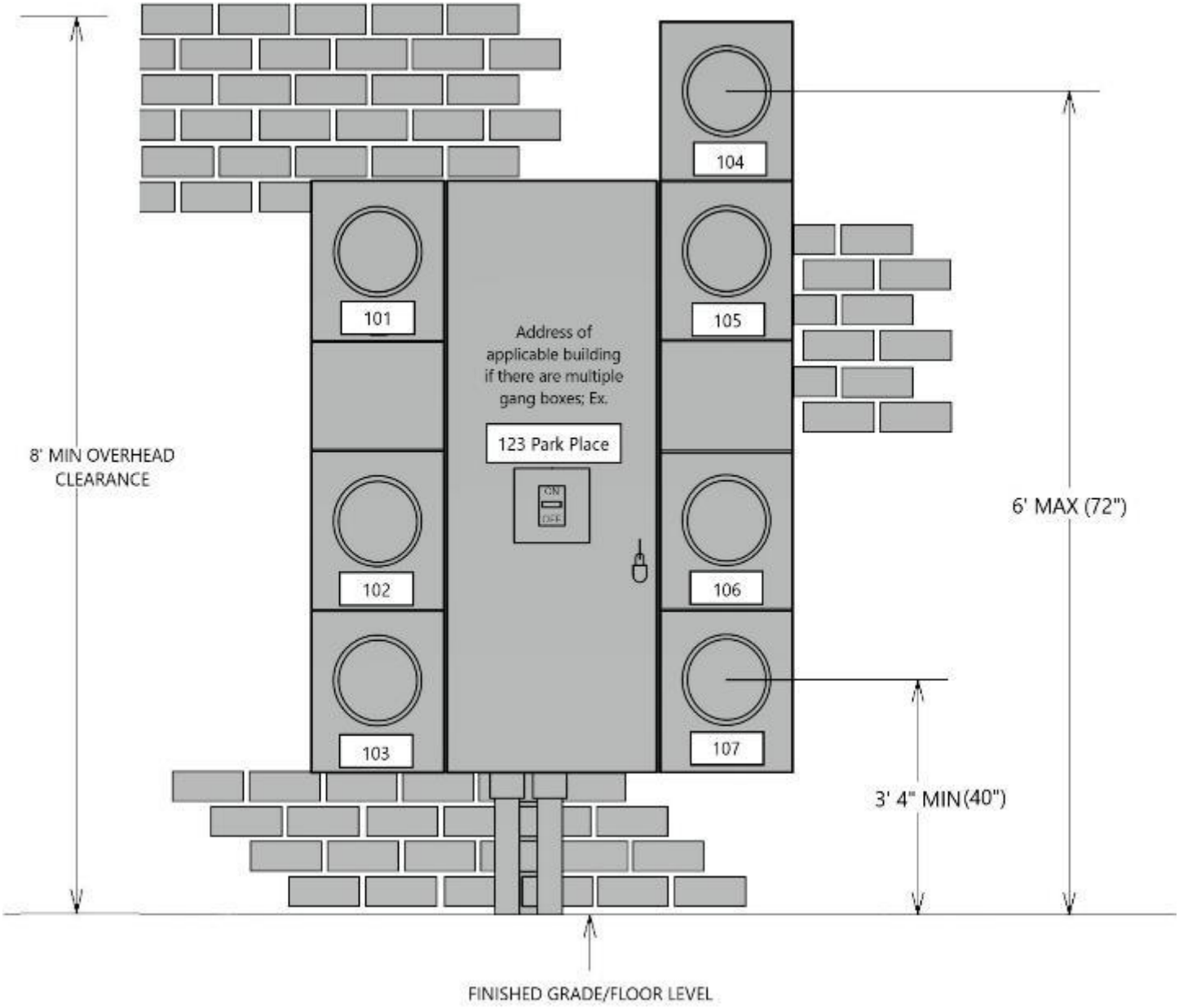
3. **Customer-Generator Facility** means equipment used by a customer to generate, manage, and monitor electricity. A Customer-Generator Facility, which typically includes an electric generator and/or an equipment package, shall:
    a. Satisfy all of the applicable requirements of the Net Metering Rules;
    b. Meet all applicable safety and performance standards established by the National Electrical Code, the Institute of Electrical and Electronic Engineers, and Underwriters Laboratories to ensure that net metering customers meet applicable safety and performance standards; and
    c. Comply with the City's interconnection tariffs and operating guidelines.
4. **Delmarva Power** refers to Delmarva Power & Light Co., and electric utility and transmission supplier, or its successor(s).
5. **Eligible Energy Resources** means the following energy sources located within the PJM region or imported into the PJM region and tracked through the PJM Market Settlement System:
    a. Solar energy technologies that employ solar radiation to produce electricity;
    b. Electricity derived from wind energy;
    c. Electricity derived from ocean energy including wave or tidal action, currents, or thermal differences;
    d. Geothermal energy technologies that generate electricity with a steam turbine, driven by hot water or steam extracted from geothermal reservoirs in the earth's crust;
    e. Electricity generated by a fuel cell powered by Renewable Fuels;
    f. Electricity generated by the combustion of gas from the anaerobic digestion of organic material;
    g. Electricity generated by a hydroelectric facility that has a maximum design capacity of 30 megawatts or less from all generating units combined that comply with environmental standards promulgated by DNREC in its "Environmental Standards for Eligible Energy Resources" (Title 7, Division 2104);
    h. Electricity generated from the combustion of biomass that has been cultivated and harvested in a sustainable manner as determined by DNREC in its "Environmental Standards for Eligible Energy Resources" (Title 7, Division 2104), and is not combusted to produce energy in a waste to energy facility or in an incinerator;
    i. Electricity generated by the combustion of methane gas captured from a landfill gas recovery system; provided, however, that:
        i. Increased production of landfill gas from production facilities in operation prior to January 1, 2004 demonstrates a net reduction in total air emissions compared to flaring and leakage;
        ii. Increased utilization of landfill gas at electric generating facilities in operation prior to January 1, 2004 (i) is used to offset the consumption of coal, oil, or natural gas at those facilities, (ii) does not result in a reduction in the percentage of landfill gas in the facility's average annual fuel mix when calculated using fuel mix measurements for 12 out of any continuous 15 month period during which the electricity is generated, and (iii) causes no net increase in air emissions from the facility; and

iii. Facilities installed on or after January 1, 2004 meet or exceed 2004 Federal and State air emission standards, or the Federal and State air emission standards in place on the day the facilities are first put into operation, whichever is higher.

6. **Host Customer**" means the customer account directly connected to a Customer-Generator Facility or Community Energy Facility, or, for a stand-alone Community Energy Facility, the customer account as designated by the Subscribers who share the energy production of the Community Energy Facility.
7. **Net Metering** means a service to a customer whereby electric energy generated by the customer, through a Customer-Generator Facility and delivered to the local distribution facilities of the City, may be used to offset electric energy provided by the City to the customer.
8. **PJM** means "PJM Interconnection, LLC," the Regional Transmission Organization ("RTO") that is responsible for wholesale energy markets and the interstate transmission of energy throughout a multi-state area, or its successor organization.
9. **Renewable Energy Credit** or "REC" means a tradable instrument comprised of all the Generation Attributes equal to 1 megawatt-hour of electricity derived from Eligible Energy Resources and that is used to track and verify compliance with the provisions of Delaware Public Service Commission Regulation Docket No. 56. A REC does not include emission reduction credits and/or allowances encumbered or used by a Generation Unit for compliance with local, state, or federal operating and/or air quality permits associated with the 1 megawatt-hour of electricity.
10. **Subscriber(s)** means the person(s) who are otherwise customers of the City that are entitled to share in the energy production of a Community Energy Facility

Appendix 1

Drawing M1



Drawing M2