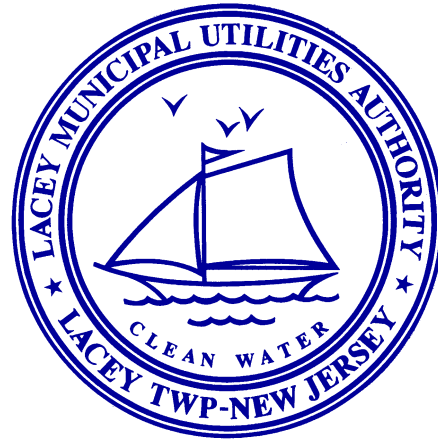


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Lacey Municipal Utilities Authority

RULES AND REGULATIONS

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INTRODUCTION AND PURPOSE

The Lacey Municipal Utilities Authority is a public body politic and corporate created by virtue of an ordinance of the Township of Lacey adopted on July 2, 1971. The boundaries of the Authority and the Township are coterminous. The Township created the Authority in order to provide water and sanitary sewer services to the residents of the Township.

In order to facilitate the work of the Authority and the upgrading of water and sewer facilities within the Township, the Township has had in effect, since April 4, 1973, Chapter 404-2, Code of the Township of Lacey, which by its terms, requires the owner of any dwelling or building occupied by persons located upon any street in which a sanitary sewer is constructed to connect such dwelling to the sanitary sewer system. The same requirement is made for new dwellings constructed in streets on which sanitary sewers are available. In addition, the Township has had in effect since October 23, 1986, Chapter 289-2, Code of the Township of Lacey, which by its terms, requires the owner of any dwelling or building occupied by persons located upon any street in which a waterline is constructed to connect to the water system. The same requirement is made for new dwellings constructed on streets on which waterlines are available.

The Authority is responsible for the compliance of adopted Bond Resolutions, service contracts with the Ocean County Utilities Authority and all applicable State and Federal Laws governing pollution control, drinking water quality, and other Municipal Laws and Ordinances.

The public's interest is best served through the use of standardized procedures for the approval and the installation of the water and sanitary sewer utility improvements which must be consistent with and follow the accepted procedures established in the "Municipal Land Use Law," P.L.1975, c.291 (C.40:55D-1 et seq.).

The Authority has established the following rules and regulations and procedures to facilitate the review of applications for water and sanitary sewer service and the construction of Water and Sanitary Sewer Facilities within Lacey Township.

All individual property owners of residential, commercial or industrial properties are required to submit applications to the Authority for the review of all phases of planning, design, and construction of the water and sanitary sewer facilities. Applications for review are required to provide for the unified and systematic construction of the water and sanitary sewer facilities within the Township of Lacey. The need for these rules and regulations are further strengthened by the imperative to foster and promote the protection of Lacey Township's natural water resources.

The offices of the Lacey Municipal Utilities Authority are located at 124 South Main Street, Forked River, New Jersey. Its business hours are Monday through Friday, 8:15 a.m. to 4:15 p.m.

Regular Public Meetings are generally held each month as advertised and in accordance with the provisions of the Open Public Meetings Act (N.J.S.A. 10:4-6 et seq.).

1.0 DEFINITIONS

As used in the following Rules and Regulations, unless a different meaning clearly appears in the context, the following terms shall have the meanings indicated:

APPLICANT shall mean property owner; or if owned by a company, a proper official of said company; or an authorized agent of the owner, certified to the Authority as such, making application to the Authority for review and approval of plans and/or connection to the utility systems.

AUTHORITY / LMUA shall mean the Lacey Municipal Utilities Authority.

AS BUILT shall mean a record of Sanitary Sewer or Water Facilities, as constructed.

AUXILIARY BUILDING shall mean a subordinate building, the purpose of which is customarily incidental to that of the principal building and which is located on the same lot as the principal building. The primary use of the auxiliary building shall not be residential, commercial or industrial occupancy.

BOARD shall mean the Authority Board of Commissioners.

BUILDING shall mean any structure which is used or intended for supporting or sheltering any use or occupancy.

CONTRACTOR shall mean the party contracting with an applicant performing site improvements.

CUSTOMER shall mean same as property owner.

DEVELOPER shall mean the person, persons, Company, Corporation, etc., performing site improvements.

ENGINEER shall mean the Consulting Engineer appointed by the Authority.

ESTIMATED PROJECT COST shall mean the estimated cost of construction, right of ways, easements, engineering, bonds, insurance, legal and administrative services.

INDUSTRIAL USER shall mean any user whose wastewater differs from the normal characteristics of domestic wastewater.

INDUSTRIAL WASTE shall mean the wastewater from industrial processes or other commercial operations, which is distinct from or incompatible with domestic wastewater.

pH shall mean the logarithm of the reciprocal of the weight of hydrogen ions in grams per liter of solution, and is the measure of acidity or alkalinity.

MAIN shall mean the Authority owned piping and appurtenances, in or along public rights of way, or within Authority easements, used for the transmission and distribution of water or for the collection of wastewater to or from its customers, respectively.

PUMPING STATION shall mean a permanent facility constructed to convey sewage to another sewer by pumping, rather than by gravity.

PROPERTY OWNER shall mean the owner of record of a property served or to be served by the Authority, who shall be solely responsible to the Authority for water and/or sewer service charges.

RESPONSIBLE PERSON shall mean the contractor's field representative who is responsible for job site safety and proper construction of the water and/or the sewer system. This person is generally referred to as the Contractor's Superintendent.

SLUG shall mean any discharge of water, sewage or industrial waste into the sanitary sewer collection system which consists of any concentrated constituent or quantity of flow exceeding any period of duration longer than (60) minutes, that exceeds four (4) times the average daily concentration or flow of a normal operational day.

TOWNSHIP shall mean the Township of Lacey, in the County of Ocean, State of New Jersey.

SERVICE UNIT shall mean the following:

- a) Each single-family detached dwelling.
- b) Each single-family attached dwelling.
- c) Each single-family apartment dwelling.
- d) Each lot created in a major or minor subdivision.
- e) Each commercial, industrial, professional, public, institutional or other non-residential user whose metered or estimated water consumption does not exceed the estimated average daily flow of water for the average single family residence.

SEWER shall mean any main designed or used for collection or disposal of sanitary sewage or wastewater and located in any public street, easement, or public right of way.

UTILITY SYSTEMS shall mean the public water and sanitary sewer systems owned and operated by the Authority.

2.0 POLICY FOR PROVIDING SERVICE

It is the policy and intent of the Authority to provide potable water and sanitary sewer service to applicants owning or occupying properties located in Lacey Township who have received approvals from the relevant Township Municipal Land Use Agencies consistent with applicable laws and sound utility management practices.

Availability of utility services shall be determined through an application procedure enabling the Authority to review the needs of each applicant and the capacities and availability of the Authority's facilities. Determination of the availability of capacity and the processing and approval of applications for connection to the utility systems shall be within the sole discretion of the Authority.

In the event that extension or improvements of the Authority's water mains, sewer mains or related facilities are necessary to provide service to an applicant's property, it shall be the applicant's responsibility to pay all costs associated with the required extensions or improvements.

Should the Authority's water and sanitary sewer systems not be available to an applicant's property at the time an application is made to the Authority, the applicant will be required to

install "dry" sanitary sewer and water mains, services, and appurtenances as may be directed by the Authority. Said facilities shall be designed and constructed in accordance with the Authority's Rules and Regulations. All costs associated with the design and construction of said facilities shall be the responsibility of the applicant.

3.0 AUTHORITY'S RESPONSIBILITIES

The Authority shall operate and maintain a water supply and distribution system and a sanitary sewer collection and transmission system within the Township of Lacey to service the customers of the Authority. The Authority shall abide by all Federal, State and local laws pertaining to the operation and maintenance of a public water and sanitary sewer system. The Authority will maintain all utility facilities within public right-of-ways, deeded easements to the Authority and Authority owned properties. The Authority will maintain the individual service lateral, water or sewer, to individual customer lots, establishments or homes to the first cleanout inside the curb line for sewer service, and the first shut-off valve (curb box) inside the curb line for water. In the absence of curbs, the Authority's responsibility shall end at the edge of the public right of way, and in no circumstance shall extend onto the customer's property.

The Authority requires water meters to be installed on each water connection in a location and setting as specified by the Authority. The Authority will read the meter to establish a charge for the customer in accordance with a Schedule of Rates and Fees adopted by the Authority. The Authority shall retain ownership of the meter and shall repair, replace, or test the meter as is deemed necessary by the Authority.

The Authority shall in no event be responsible for maintaining any portion of the service line owned by the customer, or for damage done by water or sewage escaping therefrom; it is expressly understood and agreed that no claims will be made against the Authority or its employees for damage to life or property, by reason of the breaking of any service pipe, water fixture, meter or appliance within the customer's premises, unless caused by the negligence of the Authority or its employees, nor for any damage due to the failure of the water supply for any cause beyond the Authority's control.

4.0 CUSTOMER'S RESPONSIBILITIES

The customer shall maintain all connections, service lines and fixtures owned by the customer in good working condition. Meters owned by the Authority located on the property of the customer shall be protected properly and cared for by the customer. Meters shall be located in a heated protected area, free of clutter and accessible at all times upon adequate notice by the Authority. Meters will be maintained by the Authority so far as ordinary wear and tear are concerned, but damage resulting from freezing or external causes due to the negligence of the customer shall be paid for by the customer at a cost established in the Authority's current Schedule of Rates and Fees.

5.0 BILLING

The Authority shall read meters and bill its customers for water and sewer service in accordance with the current Schedule of Rates and Fees. Bills are payable at the Authority's business office, located at 124 South Main Street, P.O. Box 205, Forked River, NJ. All bills are due and payable on the 15th of the month in which the bill is processed and considered past due on the close of business on the last day of the month that the bill is due. If a bill remains unpaid beyond the last business day of the month, it will be classified as delinquent and will be charged an interest fee in accordance with N.J.S.A. 40:14B-41.

In the event of a disputed account involving the accuracy of the meter or the meter reading or involving payment for some other service as provided for in the current Schedule of Rates and Fees, withholding payment shall not be an acceptable remedy. The Authority shall respond to such disputes in a diligent manner to bring about a resolution. Upon written request by the customer, and in accordance with the current Schedule of Rates and Fees, a meter may be independently tested for accuracy. If, when tested, the meter is found to be in error in excess of plus or minus 2 ½%, the bill will be adjusted accordingly. If the meter is found to be operating properly and registering accurately, the customer shall be responsible for the cost of testing of the meter, in accordance with the current Schedule of Rates and Fees.

6.0 MISCELLANEOUS FEES AND SERVICES

The Authority may provide at the request of a customer or as needed to maintain the integrity of its utility system certain services, the cost of which shall be borne by the customer at a fee authorized in accordance with the current Schedule of Rates and Fees. Some of these services

may include, but not be limited to, shut off of service, restoration of service, inspection of service connection, meter test, repair or replacement of meters, fire flow tests or other services and charges as contained in the current Schedule of Rates and Fees.

7.0 GENERAL DESCRIPTIONS

7.1 Equivalent Service Unit

The equivalent service unit shall be representative of the average daily flow of water used by the average single-family residential dwelling unit. The equivalent service unit is recomputed annually by dividing the total residential water use by the total number of residential connections serviced by the Authority at the end of the immediately preceding fiscal year.

Residential: Each single-family residential dwelling shall be considered as one equivalent service unit (ESU).

Multiple-Family Residential and Non-Residential: The initial number of service units for each multi-family, commercial, industrial, institutional, professional, public, or other user, not heretofore mentioned, whose estimated water consumption exceeds one equivalent service unit, shall be calculated by dividing the estimated water use by the equivalent service unit. The number of units shall be rounded up to the nearest one-tenth (1/10) of a unit, with a minimum of one unit per user.

7.2 Service Installation Fee

The cost of any service connections required to be installed by the Lacey MUA, will be charged based on time and material, plus 20% to cover administrative processing expenses.

7.3 Initial Service Charge (Connection Fee)

Each connector to the Authority's wastewater collection system and the public water system shall pay an initial service charge to connect directly or indirectly to the system. The initial service charge represents payment of an amount that has already been paid by existing customers towards the retirement of the debt service of the existing facilities. The initial service

charge is recomputed annually in accordance with N.J.S.A. 40:14B-21 and is listed in a separate Schedule of Rates and Fees and made a part of the Rules and Regulations, as amended.

7.4 Service Charges

Each customer receiving sanitary sewer and water service shall pay a minimum amount in the form of a basic service charge. The service charge for all classes of users is listed in a separate Schedule of Rates and Fees and made a part of the Rules and Regulations, as amended.

7.5 Metered Consumption Charge

In addition to the service charge, a metered charge may be billed for service used based on the consumptive readings. The metered charge for all classes of users is listed in a separate Schedule of Rates and Fees and made a part of the Rules and Regulations, as amended.

7.6 Other Fees and Charges

Certain fees may be required for such items as permits, inspections, service calls, meter testing, private fire protection service, etc. Such fees are contained in a separate Schedule of Rates and Fees, which is available upon request.

7.7 Water Meter Damage

Customers' Property

For those water meters located on the customers' property (as opposed to within the public right-of-way), due to the fact that the Authority does not have the right to control the activities on private property, it shall be the responsibility of the property owner to insure proper protection of the water meter. In any case where a water meter had been adjusted or damaged due to freezing, vandalism or tampering, the customer on whose premises said meter is located shall be charged a cost recovery service charge in the amount as set forth in the current Schedule of Rates and Fees.

Public Right-of-Way

For those water meters located within the public right-of-way, if the Authority has evidence verifying that the water meter was adjusted, damaged or tampered with by the customer, its agent or employees, then and in that event the customer shall be charged a cost recovery service charge in the amount as set forth in the current Schedule of Rates and Fees.

8.0 MULTIPLE METERS

At the option and expense of the property owner, individual water meters may be installed and used for the purpose of measuring the water consumption of individual units located within a common building, serviced by a common water and sewer service. Each individual water meter installation shall constitute a separate and individual water and sewer account. Applications for individual water meter installations shall be made to the Lacey Municipal Utilities Authority on forms provided by the Authority. All individual accounts shall be in the name of and billed to the property owner of record. All water meter installations shall meet the Authority's specifications and be installed in accordance with the Authority's rules and regulations.

9.0 IRRIGATION METERS

At the option and expense of the property owner, individual water meters may be used for the purpose of measuring the water used for irrigation. Applications for irrigation water meter installations shall be made to the Lacey Municipal Utilities Authority on forms provided by the Authority. All water meter installations shall meet the Authority's specifications and be installed in accordance with the Authority's rules and regulations. Irrigation water meters shall be billed separately for water use only.

10.0 POOL FILL METERS

Upon application to the Authority, temporary meters may be obtained for the purpose of filling swimming pools. Following the return of the meter and processing of the appropriate paperwork, a sewer billing credit will be issued for the amount of water registered on the meter. Potential savings will vary, depending on regular water use. Not all customers will experience savings.

11.0 SURCHARGE

Any user of the Authority's collection system that discharges sewage which exceeds the maximum sewage strength requirements established by the Ocean County Utilities Authority shall be surcharged for the amount of the excess strength times the unit costs, as established by the Ocean County Utilities Authority in addition to the annual charge. The Lacey Municipal Utilities Authority shall levy the surcharge to the user.

12.0 PAYMENTS

Late payments: A late fee shall be charged for past due balances, commencing on the first of the month following the due date on the unpaid past due balance and until said payment and the late fees thereon has been made. The late payment charges shall be computed in accordance with N.J.S.A. 40:14B-41.

Initial Service Charge: An optional payment plan is available to existing units, which previously received a Certificate of Occupancy prior to sanitary sewer or water service being available. At the option of the customer, the Initial Service Charge (connection fee) may be paid off over a five-year plan. The five-year payment schedule requires a payment of 50 percent down and the remaining 50 percent of the fee to be paid off over a five-year schedule, with equal installments made, plus interest at the rate of 8 percent per annum on the then principal balance. If the customer has elected to maintain a payment plan, as established by the Authority for the initial service charge, and fails to pay the amount due by or before the due date, the payment plan shall be considered in default and the entire balance shall become due within 30 days.

13.0 CONNECTIONS

Any building adjoining any public street or easement in the Township in which a sewer or waterline is now or may be hereafter constructed shall connect such building and all facilities therein to the sewer and waterline.

Existing buildings set back in excess of 200 feet from the center line of an existing street or easement upon which the property fronts or abuts shall not be required to connect to the sewer

line, provided that the existing septic disposal system is functioning properly and without creating a nuisance or a health hazard.

Existing buildings used and occupied as single-family dwellings, which are below the level of the sewer line or cannot obtain a pitch of ¼ inch to one foot of sewer line, shall not be required to connect to the sewer line, provided that the existing septic disposal system is functioning properly and without creating a nuisance or a health hazard.

When connection to the public sanitary sewer is made, any existing septic tanks and cesspools shall be decommissioned in accordance with jurisdictional law.

All new buildings adjoining any public street or easement in the Township in which a sewer line is now or may be hereafter constructed shall be required to connect to the sewer line regardless of the distance between the building and the sewer line or the ability to obtain a pitch of ¼ inch to one foot of sewer line.

On lots where there are two (2) or more buildings, each building shall be separately connected to the water and or sewer main line with its own lateral, except in the case of an auxiliary building, the purpose of which is incidental to that of the principal building. The primary use of the auxiliary building shall not be for residential, commercial or industrial occupancy.

14.0 INDUSTRIAL COST RECOVERY

In the event that an applicant for sewer service is classified as an industrial user, as defined by the U.S. Environmental Protection Agency, the applicant will be required to make additional payments conforming to an Industrial Cost Recovery System required by the U.S. Environmental Protection Agency.

15.0 WATER SYSTEM USE REGULATIONS

15.1 Prohibited Connections

No person shall connect or be allowed to be connected to any part of the water system without a water meter being installed and approved by the Authority.

No person shall connect or be allowed to be connected to any part of the water system without first having a properly installed backflow prevention device approved and inspected by the Authority.

The Authority does not permit any type of cross connection with a private well water supply or any other water supply not regulated by the Authority. All customers with a private well supply in addition to a public water service must physically disconnect the two (2) water sources. The Authority may inspect the physical disconnection at various times as it deems necessary.

15.2 Permit Required

No unauthorized person shall uncover, make connection into, use, alter or disturb any municipal water service or appurtenances without first having obtained a written permit from the Authority.

15.3 Meters Required

All water taps made and services installed must be metered.

No person, other than an employee of the Authority, shall remove, replace or in any manner interfere or tamper with a meter attached to a water pipe used or intended to be used to supply water to any building. This applies whether the meter is set within or without the building. Any plumbing configuration intended to bypass the meter is prohibited.

15.4 Curb Stops

Under no circumstances shall curb stops be opened or closed by any person without authorization of the Authority, except that a licensed plumber may open or close the curb stop to test his work or make emergency repairs.

15.5 Fire Hydrants

No unauthorized person shall tamper with, operate or cause to operate any municipal water system fire hydrant without authorization from the Authority.

15.6 Maintenance of Equipment

Authorized representatives of the Authority shall have the power to enter, at all reasonable times and after reasonable notice, any premises on which municipal water equipment is installed for the purpose of reading meters and inspecting, rehabilitating, improving, repairing, replacing or upgrading Authority equipment.

The Customer shall maintain the service facilities located on their property, including service pipe, valves, interior plumbing, etc., in good working condition. Any leak or failure in the service shall be repaired immediately. Any problem with the water meter must be reported to the Authority as soon as it is found. Failure to repair a leak can result in excessive water use and shall constitute grounds for shutting off the water service for willful waste of water.

16.0 SANITARY SEWER USE REGULATIONS

16.1 Prohibited Connections

1. No person shall connect any building into any part of the sewer system without first obtaining a permit from the Authority.
2. No person shall connect or be allowed to be connected to any roof downspout or gutter designed to collect precipitation, exterior foundation drains, areaway drains or other sources of surface runoff or groundwater to any building sewer or building drain which is connected directly or indirectly to the sanitary sewer system.
3. Under no circumstances shall grease pits, air conditioning equipment, storm water inlets, drains from equipment or sump pumps be allowed to connect directly or indirectly into the sanitary sewer system.
4. No interior plumbing fixtures shall be connected to a gravity sewer line that is less than (8") above the rim elevation of the nearest street sanitary sewer manhole cover. The property owner shall be responsible for installing any backwater valves to protect his

property should there be a wastewater backup in the sewer line. The Authority assumes no responsibility for property.

The customer shall be responsible for maintaining all connections, service lines and fixtures owned by the customer in good working order. The Authority shall in no way be responsible for maintaining any portion of the building service line or for damage, or personal injury or illness caused by sewerage back-ups into private service lines or fixtures.

16.2 Regulations Governing Waste Discharged into the Sewer System

All users of the Authority's collection system shall conform with and abide by the minimum requirements of the Authority as presently enacted and as amended and supplemented from time to time.

Wastewater delivered into the facilities of the Authority shall not:

1. Be in such quantity as to impair or exceed the hydraulic capacity of such facilities as determined by the Authority's Engineer.
2. Contain any amount of solid matter that will prevent self-scouring flow when carried in sewers installed at the minimum design values.
3. Be of such a nature as to create explosive conditions.
4. Be of such a strength, quantity or quality as to impair the operation or lower the efficiency of the processes of wastewater treatment and sludge handling and disposal, such as excessive biochemical oxygen demand, suspended solids, chlorine demand, or substances inhibitory to the biological processes such as excessive heavy metal, phenols and their derivatives, strong oxidizing agents or strong reducing agents.
5. Be of such a nature as to prevent the effluent from the plant from meeting all present or future requirements of any governing agency having jurisdiction over the receiving waters, such as standards for biochemical oxygen demand, chemical oxygen demand,

suspended solids, color, heavy metals, dissolved oxygen in both effluent and receiving waters, bacterial counts, etc.

6. Contain any gasoline, benzene, naphtha, fuel oil, or other flammable or explosive liquid, solid, or gas, which by reason of its nature or quality may cause fire or explosion or which, in any other way, may be injurious to personnel or facilities within the sewerage system.
7. Be of such a nature as to form noxious or malodorous gases or substances which either singularly or through interaction with other wastes or substances found in wastewater treatment process create a public nuisance, hazard to life, or prevent entry into any portion of the sewerage system for operational duties, maintenance or repair.
8. Be of such a nature as to, in any manner, impair the strength, function, or durability of any portion of the sewer facilities, such as compounds producing hydrogen sulfide or any other substances corrosive to any measurable degree to any materials used in the sewer system.
9. Be of such nature and in such a quantity as to impair the hydraulic capacity of such facilities, normal and reasonable wear and usage excepted; such wastes would include uncomminuted garbage, animal guts, tissues or blood, paunch manure, bone, hair, hides, fleshings, entrails, feathers, sand cinders, ashes, spent lime, stone or marble dust, metal, glass, straw, shavings, grass clippings, rags, spent grain, waste paper, wood, plastic, asphalt residues, etc..
10. Include any radioactive substance.
11. Include any garbage other than that received directly into public sewers from residences.
12. Have a pH value lower than 5.5 or higher than 9.5.
13. Have a temperature higher than one hundred fifty degrees Fahrenheit (150°F.)

14. Have a flash point lower than 235°F as determined by the tagliabue (tag) closed cup method.
15. Contain fats, wax, grease, or oils, whether emulsified or not, in excess of one hundred milligrams per liter (100 MG/L) or containing substances which may solidify or become viscous at temperatures between thirty two (28°F) and one hundred fifty (150°F) degrees Fahrenheit.
16. Be discharged by tank trucks into manholes or appurtenances of the sewerage system without written consent of the Authority.
17. Be delivered in a “slug” manner, in which the normal hydraulic or organic loadings have been exceeded by more than a 4.0 factor for any sixty (60) minute period.

The Authority may accept industrial waste provided the following criteria are met:

1. Industrial users shall make application to the Authority to discharge industrial waste.
2. Such applications shall require the industrial user to provide information on the quantity, nature, and quality of the waste.
3. Industrial user shall also be required to bear all costs associated with chemical analysis and laboratory services and provide a point of access for the Authority to sample the waste stream.

Industrial user shall indemnify and hold the Authority harmless in the event of damage or sanctions arising from or related to waste discharged by industrial users into the Authority's collection system.

The Authority herein adopts by reference the Ocean County Utilities Authority's "Sewer User Regulations" as presently enacted and as amended and supplemented from time to time as the Authority's minimum requirements. Industrial users shall conform to all regulations of The

Ocean County Utilities Authority not specifically mentioned herein and available from THE OCEAN COUNTY UTILITIES AUTHORITY, 501 Hickory Lane, Bayville, NJ.

The Lacey Municipal Utilities Authority reserves the right to make whatsoever changes in its discharge requirements as may be necessary for the operation, maintenance, and protection of its sewerage system, for meeting revised standards of influent or effluent quality of regulatory agencies having jurisdiction in this regard, or for any other reason the Authority deems is desirable or necessary for performing its stated functions. The Authority reserves the right to require pretreatment where the chemical characteristics of the waste make such treatment desirable or mandatory.

16.3 Grease Traps

All connections to the sewerage collection system for garages or other buildings in which grease or oil is handled must be equipped with a suitable mechanism to trap and collect all such oils and greases.

All food service establishments such as restaurants, bakeries, etc. that dispose of fat, oil or grease wastes into the sanitary sewer collection system shall be required to install an approved grease trap. Grease traps or separation devices that are approved by the State of New Jersey Plumbing Code and local code, as promulgated by the Township Board of Health, must be routinely maintained at those locations. The Authority reserves the right to approve of the installation and thereafter routinely inspect the system for proper maintenance. The customer shall prepare and submit to the Authority a written program of inspection and cleaning of the trap.

17.0 ORAL AGREEMENTS

No agent or employee of the Authority has authorization to bind it by any promise, agreement or representation not provided for in these Rules and Regulations. The Authority reserves the right to change, delete or add to the foregoing Rules and Regulations when it is in its best interest to do so.

18.0 OMNIBUS PROVISIONS

Notwithstanding anything expressed or implied in the Authority's Rules and Regulations to the contrary, the following shall apply:

Indemnification/Holdharmless: It is a condition of Authority review, approval, and service that all applicants, developers, and customers shall indemnify and hold the Authority, its officers, employees, representatives, and agents harmless from and against any and all damage, injury, loss, liability, cost, legal expense, fines, penalties, surcharges and/or other expense of any nature whatsoever arising from or related to said party's acts and/or omissions and/or the acts and/or omissions of said party's officers, employees, contractors, assignees, representatives or agents.

Reservation of Legal Rights, Remedies and Immunities: The Authority expressly reserves unto itself the right to pursue any and all available legal and/or equitable rights and/or remedies as same may be amended or supplemented hereafter. Similarly, the Authority reserves the ability to avail itself of all immunities and/or limitations on liability which may be afforded at law or in equity as same may be amended or supplemented hereafter. Nothing expressed or implied in the Authority's Rules and Regulations shall be construed to restrict, limit, waive, or abandon said reservation of rights, remedies and/or immunities in anyway.

Sanctions: In the event that the Authority is assessed with fines, penalties, surcharges, civil administrative penalties or other sanctions arising from or related to the acts and/or omissions of applicant(s), developer(s) and/or customer(s), the responsible party shall pay to the Authority a sum equal to 120 percent of any such assessment.

Protection of Authority Property: Tampering with Authority property is strictly forbidden and may result in criminal as well as civil sanctions. In the event that non-compliance with Authority Rules and Regulations or other acts or omissions may result in harm to the Authority or its systems, the Authority reserves the right to take reasonable corrective measures and to assess the cost thereof to the responsible party.

Liability of Property Owner: The property owner is ultimately responsible for payment of all Authority bills and satisfaction of all obligations owed to the Authority, notwithstanding any

tenancy affecting or relating to the property. The Authority reserves the right to secure a lien upon the property in the event of non-payment, provided that the same shall be in addition to, and not in lieu of, other available remedies.

19.0 REQUIREMENTS FOR APPLICATION FOR SERVICE

19.1 Application for Individual Service

Property Owners desiring to make connection to the existing water and/or sewer system or individuals seeking a determination of availability of service shall apply for a Statement of Utility Services from the Authority. The Authority will make a determination as to the availability of service within five (5) business days.

Upon a positive determination (service available), an Application for Connection must be submitted. Payment of all applicable fees shall be paid at this time, in accordance with the current Schedule of Rates and Fees.

If a water service and/or sewer lateral is not available for connection, the applicant will be responsible for the installation of the service/lateral, under the inspection of an Authority representative. Any water service and/or sewer lateral installation not inspected by the Authority shall be dug up for inspection prior to service approval.

Prior to connection to the Authority's system, the applicant must request a water meter, which must be installed within 3 business days of receiving the meter.

Upon installation of the water meter, the Owner shall contact the Authority to schedule an inspection of the meter installation.

All newly constructed dwellings connecting to the Authority's system must receive a Certificate of Compliance from the Authority prior to the issuance of a Certificate of Occupancy.

19.2 Application for Developer Service

Any subdivisions of land, improvement of an unimproved street, site plan development or any residential structure to be used by two or more families, regardless of volume of flow, and all non-residential development, such as schools, commercial buildings, industrial buildings, and all similar structures shall be required to obtain approval of utility services from the Authority.

Unless a Letter of No Interest is issued during the preliminary review process, the Authority has three levels of utility service review: Preliminary Plan Review, Tentative Plan Review and Final Plan Review. The Owner, proper official of the Company, or an authorized agent shall sign all applications. All fees shall be paid in accordance with the Authority's current Schedule of Rates and Fees upon submission to the Authority of a completed application.

The period for review shall be consistent with the extent of the development application. Generally, the Authority shall approve or disapprove the application within 60 days of the date the application is deemed complete. The Authority reserves the right to extend the time for approval or disapproval, should extenuating circumstances require an extension of time.

Upon approval by the Authority, a copy of the resolution approving the application, a copy of the engineer's recommendations and any other Authority requirements will be furnished to the applicant and to the applicant's engineer.

Review and approval of the plans and specifications by the Authority shall not relieve the applicant or his contractor of any responsibility, and the Authority and/or the Authority Engineer shall not consider such review and approval as an assumption of any risk or liability by the Authority or the Authority Engineer. The applicant shall have no claim against the Authority due to the failure or inefficiency of any plan or method so reviewed.

Sewer applications will not be considered unless an accompanying water application is or has been submitted. Likewise, water applications will not be considered unless an accompanying sewer application is or has been submitted.

In addition to approval of the Authority, projects may require approvals from other agencies such as the New Jersey Department of Environmental Protection, Ocean County Utilities Authority, Local Land Use Agencies, and other county, state or federal permits. It shall be the sole responsibility of the applicant to obtain any necessary permits and adhere to the requirements of all of the governing agencies, which have jurisdiction over the project.

19.2.1 Application for Review of Preliminary Plans

An application for review of preliminary plans shall be submitted to the Authority for any subdivision of land, improvement of an unimproved street, proposed extensions or changes to any of the Authority's water or sewer facilities, site plan development, non-gravity sewer service (ejector pump), all non-residential development or any residential structure to be used by two or more families, regardless of volume of flow. This application would be for a determination of whether a connection will be required, identification of off-site improvements, sizing of main extensions, ejector pump specifications, etc.

Submittals shall include an application form entitled Application for Review of Preliminary Plans and three sets of conceptual plans at a 1" =100' minimum scale, indicating the nature, size and location of the proposed development. An application fee and review fee in accordance with the prevailing Schedule of Rates and Fees shall accompany the application. Preliminary Approval is valid for one year from the date of approval by the Authority.

A Letter of No Interest may be issued during the Preliminary Review, if the proposed work does not involve a major subdivision or major site plan and will not cause any changes to the water and sewer systems. There is no additional fee associated with the issuance of a Letter of No Interest.

19.2.2 Application for Review of Tentative Plans

If an application for tentative approval is required, the applicant shall be required to submit an application form entitled Application for Review of Tentative Plans. This application shall be of sufficient detail to enable the Authority to review the adequacy of the proposal in accordance with the Authority's construction specifications.

Submittals shall include three copies of detailed plans and profiles for the proposed sewer and/or water systems, properly entitled. The plans shall be 24" X 36", with a 1 ½" border on the left side for binding. All sheets shall be numbered. Profiles for sewers shall show all manholes, siphons, pumping stations, storm sewer crossings, water main crossings, and elevations of stream crossings using USGS elevations. Gradients and diameter of sewers, rim elevations, and invert elevation shall be shown at each manhole. Profiles for water mains are not required except at sanitary sewer, storm sewer and stream crossings.

The plan view of the sewer system shall show sewer mains, service laterals, cleanouts, manholes, invert elevations, curbs, storm sewer inlets and storm sewers, and existing or planned water curb-shut off valves. The storm sewer must not interfere with the sanitary sewer or water mains. The plan view of water system shall show the location of the mains, fire hydrants, bends, services, curb stops and valves. The size, type and class of pipe shall be shown for each pipe. Service laterals, curb-shut off valves, and existing or planned sewer cleanouts shall be shown. Air relief valves should be shown, if required. The Plan view shall also show roads, curbs, sidewalks, lot lines, boundary lines, typical street cross-sections, and thrust block design.

The plan shall show contours at two-foot intervals, all existing and proposed street and surface elevations at all breaks in grade and street intersections, a north arrow, title, date and scale. Proposed systems shall be accented by bold lines. Existing systems shall be shown by dashed lines. All topographical symbols and conventions shall be USGS. Symbols for water systems shall be those approved by the AWWA. The distances and stationing between the centerlines of manholes, grades, main sizes, strength classes, and material shall be shown on the plans.

For any proposed sewage pump station, a general site plan showing boundaries, contours, proposed pump station, capacities, underground piping and valves, details and power supply lines shall be submitted.

Complete specifications for construction of the proposed pump station and appurtenances shall be prepared and submitted for review. Specifications shall include descriptions of general requirements, site work, piping and valves, concrete work, mechanical equipment and electrical work.

A detailed cost estimate for water and sewer shall be submitted using the Authority's approved unit costs. The Authority reserves the right to reject any cost estimate in which the quantities cannot be substantiated. Review fees shall be based upon this cost estimate at the rate established in the Schedule of Rates and Fees current at the time application is made.

Original NJDEP and OCUA Applications shall be submitted along with required engineer's reports for execution by the Authority upon tentative approval. Such original documents shall be returned to the applicant upon execution, and the applicant shall be responsible for the submission to the various agencies. The Authority and the Authority's Consulting Engineer shall be copied on all correspondence from the applicant to the referenced agencies.

Approval of Tentative Plan Review applications shall be for a period of two years from the date of approval if no subsequent application is submitted.

19.2.3 Application for Review of Final Plans

When the applicant receives all required permits, the applicant shall apply to the Authority for final plan approval.

The applicant shall submit an application form entitled Application for Review of Final Plans, three copies of all final revisions to the plans, specifications, final cost estimates and permit documents to the Authority for final approval.

Before the recording of final subdivision plats or as a condition of final plan approval, the Authority will require a performance guarantee assuring the installation of all on-tract and off-site utility improvements. The Authority will determine the performance guarantee requirements and any additional fees that may be required, based on the current Schedule of Rates and Fees. The Authority Engineer shall prepare an itemized cost estimate of the improvements to be covered by the performance guarantee, or approve an itemized cost estimate of the improvements as prepared by the developer's engineer, which itemized cost estimate shall be appended to each performance guarantee posted by the obligor. The applicant, at this time, shall post the performance guarantee in a form and amount suitable to the Authority.

Final Approval is valid for two years from the date of approval but may be extended at the written request of the applicant.

20.0 APPLICATION AND REVIEW FEES

Preliminary Review Application (Refer to current Schedule of Rates and Fees)

Tentative Review Application (Refer to current Schedule of Rates and Fees)

Final Review Application (Refer to current Schedule of Rates and Fees)

Inspection (Refer to current Schedule of Rates and Fees)

21.0 ESCROW ACCOUNTS

21.1 General Procedures

If the amounts for review and inspection costs and deposits for performance guarantees exceed \$5,000.00, they are deposited by the Authority according to the provisions of c.266 L.1985 in an interest-bearing account insured by an agency of the Federal Government or approved for such deposits by the State of New Jersey.

The procedure for payment from the escrow account shall be through a voucher system. The voucher will identify the personnel performing the service and for each date the service is performed, the hours spent to one-quarter hour increments, the hourly rate and the expenses incurred. Copies of payment vouchers will be submitted to the applicant for information. A statement of the account will be sent to the applicant that sets forth the amount of the deposits, the interest earned, the disbursements made and a cumulative balance.

If it is determined that there are insufficient funds in the account to enable the Authority to perform application reviews or inspections, the applicant will be provided with a notice of insufficient escrow or deposit balance, and will be given a reasonable time period to post a deposit to the account in an amount agreed upon between the Authority and the applicant. The amount will be based upon the estimated cost of the completion of the work on the application. If insufficient funds are available in the account, inspections will not be performed except for required health and safety inspections. The cost of such inspections shall be charged against the escrow account after it has been replenished.

21.2 Escrow Account Close Out Procedures

To initiate the close out of an escrow account, the applicant must send written notice to the Authority by certified mail, that the application or the improvements are completed. Within 30 days of receipt of the notice, the Authority professionals will provide a final bill to the Authority's Executive Director, with a copy to the applicant. The Executive Director will provide a final escrow accounting to the applicant within 45 days of receiving the final bill from the Authority professionals. Any balances remaining in the escrow account, including interest, which has been accrued (assuming the account was in excess of \$5,000.00), less 33.3% for the Authority's administrative costs, shall be refunded to the developer at this time.

22.0 BONDING

22.1 Performance Bond

For any project requiring the installation or improvements of water and/or sewer systems within a public right-of-way or easement on private property, that upon completion will become the property of the Authority, the applicant shall provide the Authority with a Performance Bond guaranteeing the complete construction of the approved improvements. Said Performance Bond shall be in an amount equal to 110% of the project cost estimate. A Surety Company licensed to do business in the State of New Jersey shall issue the Bond. In addition, the applicant shall post a Cash Bond, without condition, in the amount of 10% of the project cost estimate.

Irrevocable Letters of Credit on a form as prescribed by the Authority may be accepted in lieu of a Performance Bond guaranteeing the completion of the system.

The Performance Bond shall be submitted to the Authority no less than (10) working days prior to the anticipated start of construction. No work shall commence until an acceptable Performance Bond has been posted with the Authority. The Performance Bond shall remain in full effect until all construction, including final asphalt pavement, has been completed and the Authority has granted acceptance approval and all required record drawings and easement documentation have been submitted, approved and recorded.

Upon substantial completion of all required utility improvements and the connection of same to the Authority's system, the applicant may request of the Authority in writing, by certified mail addressed in care of the Executive Director of the Authority, that the Authority prepare, in accordance with the itemized cost estimate, a list of all uncompleted or unsatisfactory completed improvements. If such a request is made, the applicant shall also send a copy of the request to the Authority Engineer. The request shall indicate which improvements have been completed and which improvements remain uncompleted in the judgment of the applicant. Thereupon the Authority Engineer shall inspect all improvements covered by the applicant's request and shall file a detailed list and report, in writing, with the Authority, and shall simultaneously send a copy thereof to the applicant.

The list prepared by the Authority Engineer shall state, in detail, with respect to each improvement determined to be incomplete or unsatisfactory, the nature and extent of the incompleteness of each incomplete improvement or the nature and extent of, and remedy for, the unsatisfactory state of each completed improvement determined to be unsatisfactory. The report prepared by the Authority Engineer shall identify each improvement determined to be complete and satisfactory together with a recommendation as to the amount of reduction to be made in the performance guarantee relating to the completed and satisfactory improvements, in accordance with the itemized cost estimate prepared or approved by the Authority Engineer and appended to the performance guarantee. The Authority, by resolution, shall either approve the improvements determined to be complete and satisfactory, or reject any or all of these improvements upon the establishment in the resolution of cause for rejection, and shall approve and authorize the amount of reduction to be made in the performance guarantee relating to the improvements accepted, in accordance with the itemized cost estimate prepared or approved by the Authority Engineer and appended to the performance guarantee. The amount of reduction of a performance guarantee shall not be greater than 80%.

If any portion of the required improvements is rejected, the Authority may require the obligor to complete or correct such improvements and, upon completion or correction, the same procedure of notification, as set forth in this section shall be followed. If the required improvements are not completed or corrected in accordance with the performance guarantee, the obligor and surety, if any, shall be liable thereon to the Authority for the reasonable cost of the improvements not completed or corrected, and the Authority may either prior to or after the receipt of the proceeds thereof complete such improvements. Such completion or correction of

improvements shall be subject to the public bidding requirements of the "Local Public Contracts Law," P.L.1971, c.198 (C.40A:11-1 et seq.)

Upon the completion of construction, including final asphalt pavement, the submission and recording of all close out documents and receiving Authority approval, the applicant may request release of the Performance Bond.

22.2 Maintenance Bond

When the Authority authorizes release of the Performance Bond the applicant shall submit a Maintenance Bond guaranteeing the proper functioning of the system. The Maintenance Bond shall be in an amount not less than fifteen percent (15%) of the project cost estimate, which cost shall be determined by the Authority Engineer. The Maintenance Bond shall remain in effect for a period of two years from the date of the release of the Performance Bond. Irrevocable Letters of Credit on a form as prescribed by the Authority may be accepted in lieu of a Maintenance Bond.

23.0 CONSTRUCTION

Prior to commencement of any construction, the applicant shall provide the Authority's engineer with nine sets of plans to be approved and stamped as construction plans 10 days prior to the start of construction. A preconstruction meeting coordinated by the applicant shall be held, to include the applicant, contractor, design engineer and Authority representative as a minimum. The contractor shall be responsible for calling the New Jersey One-Call System in accordance with the New Jersey Underground Facility Protection Act (L.1994, c 118, effective November 17, 1994) N.J.S.A. 48:2-73 et seq. and supplying the confirmation number to the Authority, prior to starting any work.

The applicant shall post all inspection fees and any additional review fees as may be required by the Authority in accordance with the current Schedule of Rates and Fees. The developer shall deposit with the Authority the full amount of reasonably anticipated inspection fees unless the section of the development that is under construction is of a large size and the sewer or water utilities, or both, are going to be constructed in phases. When the developer and the Authority reach agreement on the phasing of utility construction, the full amount of reasonably anticipated inspection fees for those phases scheduled to start construction shall be deposited

with the Authority. The Authority will not perform any inspection if sufficient funds to pay for those inspections are not on deposit.

The Authority's Engineer or duly authorized representative shall inspect all utility construction for compliance with the Authority's Rules and Regulations and approved plans and specifications. The Authority shall receive three (3) business days notice prior to start of construction. The Authority inspector is an observer and is not responsible for directing the installation of the utilities or safety practices of the contractor. The Authority shall be notified in writing of the responsible person for supervision and safety of employees and the site.

After the installation of all underground utilities, curbs, and road gravel, the sewers and manholes shall be inspected for, but not limited to, line, grade, cleanliness and general workmanship. The water system shall be checked for, but not limited to, valve box grade, valve nut accessibility, hydrant grade, and color, and valve function. Hydrants shall be flow tested, and the results recorded and submitted to the Authority. Curbs shall be marked permanently with a "W" or "H" at the location of water and sewer services, respectively.

At this point the applicant shall test the facilities in accordance with the Authority's Specifications, and Record Drawings shall be provided for review and approval. The water system shall be disinfected and pass a microbiological test in accordance with the Specifications. Upon successfully completing the required testing and submitting approved Record Drawings, the Authority will consider the project substantially complete and file NJDEP's "Approval to Operate" certifications, issue a "Permit to Operate" and authorize a reduction of the performance guarantee. Under no circumstances shall the sewer or waterlines be operated without the Authority issuing a Permit to Operate.

24.0 OPERATION OF FACILITIES

After construction of all proposed improvements has been completed, the Applicant shall:

1. Obtain from the Authority Engineer a certification that the construction and testing of the facilities has been completed in accordance with the approved plans and specifications.

2. Submit a deed with metes and bounds description to all lands, easements, and improvements not previously transferred, together with title policies.
3. Submit copy of filed subdivision plat showing all easements containing the filed plat number and filing date.
4. Furnish nine copies of record drawings, two reproducible mylars and an electronic version in AutoCAD or DFX format.

25.0 ACCEPTANCE OF FACILITIES

Prior to Authority acceptance of the facilities the applicant shall:

1. Post Surety Maintenance Bond (or irrevocable letter of credit) in a form and content approved by the Authority and to the satisfaction of the Authority's Attorney equal to 15% of the project cost estimate, guaranteeing the satisfactory performance and functioning of the improvements for a minimum of two (2) years.
2. Submit Bills of Sale for all equipment and facilities, including warranties from manufacturers of equipment.
3. Submit Affidavits of Title for land, easements, and equipment and a recitation thereon that everything conveyed to the Authority has been paid for in full and a Corporate Resolution authorizing said transfers if applicable.
4. Provide an affidavit that all submittals are true, accurate and complete and that all conveyances are free from any lien or encumbrances.

The applicant may utilize the proposed closeout documents contained within the Exhibit Section. The Exhibit closeout documents are not required to be utilized, but the closeout documents must be similar in form and content to the Exhibit documents, which must be prepared by the applicant and submitted to the Authority's consulting engineer and attorney for review and recommendation of approval to the Authority.

Upon operation of the systems for the minimum two-year maintenance period and successful completion of all punch list items, the Authority will release the Maintenance Bonds.

26.0 SANITARY SEWER DESIGN AND CONSTRUCTION SPECIFICATIONS

26.1 General

The applicant shall comply with all of the Rules and Regulations as set forth herein. Failure to do so will result in a “stop work order” by the Authority. The following requirements are to be considered minimum requirements for the design and construction of sewer systems and are not intended to replace detail specifications, which are the responsibility of the applicant. They are intended to apply to usual and not exceptional conditions and are subject to amendments by the Authority. The Authority reserves the right to specify additional requirements.

The applicant shall design and construct the sanitary sewer collection system including, but not limited to, sewer lines, manholes, drop manholes, doghouse manholes, laterals, pumping stations and all accessories capable of carrying the necessary sanitary sewage flow from the proposed project.

The planning, design, construction, installation, modification, and operation of any treatment works or sanitary sewer system shall be in accordance with the applicable NJDEP rules implementing the New Jersey Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and the New Jersey Water Quality Planning Act (N.J.S.A. 58:11A-1 et seq.); and, for items not covered by NJDEP rules, with ASCE Manual on Engineering Practice No. 37, incorporated herein by reference; and, in the Pinelands Area, with Pinelands Comprehensive Management Plan and, in the coastal area, with NJDEP rules implementing the Coastal Area Facilities Review Act (N.J.S.A. 13:19-1 et seq.), with the strictest standards governing, with appropriate jurisdiction.

All standard specifications referred to herein, such as ASA, AWWA, ASTM, ANSI, and the like, shall be the latest revision thereof, at the time of Application for Final Approval.

All materials to be used on the proposed project that will become the property of the Authority upon conveyance by the applicant shall be manufactured in the United States, whenever available. The applicant is directed to refer to “Chapter 107, Laws 1982” of the State of New Jersey effective date October 3, 1982.

The applicant shall submit to the Authority for review for compliance details of the planned pipes, joints, mains, laterals, and appurtenances. The details shall comply with all standards and specifications listed herein.

For industries discharging industrial waste, a written contract with the industry will be required. An industrial discharge control manhole must be installed in accordance with the Ocean County Utilities Authority requirements.

Use of the system for the discharge of sump pumps, or drainage from cellar drains, leaders, downspouts, drainage tile, cellar pits or septic tanks or septic tank trucks and any other use for which the system was not specifically designed shall be an "Illegal Use of the System," and is strictly prohibited. Such use shall be subject to penalty and/or fine, as may be prescribed by law.

26.2 Estimation of Demand

All sanitary sewers shall be designed to carry four times the average daily flow, estimated 25 years in advance for the contributory area, when flowing full. Average daily flow shall be computed in accordance with the type of establishment and flow from NJAC 7:14A-23.3. The peak daily flow shall be computed by applying a peaking factor 2.5 times the average daily flow. The Authority may require deviations in the peaking factor value provided appropriate documentation and justification for the deviation from the standards is provided.

26.3 System Design

System design and placement shall comply with the following specifications:

Except where otherwise specified by the Authority, sanitary sewer manholes, when located within the municipal right-of-way, shall be at or near the center line of the paved cartway, but at a five (5) foot minimum from the edge of the pavement. Sanitary sewer mains shall be a minimum of ten (10) feet from the right-of-way.

Sewers shall be designed to flow with a minimum velocity of 2 feet per second and a maximum velocity of 10 feet per second at full flow based on Manning's Formula with $n = 0.01$. Inverted

siphons shall be designed for minimum velocity of 3 feet per second (3 fps) and a maximum velocity of 6 feet per second (6 fps).

The property owner is responsible to construct the sanitary sewer connection from the main to the clean out.

Sewer connection shall be made to a street main only under the review and inspection of the Authority's authorized representative. Connection to the sewer shall be made through an approved wye, saddle, or manhole. Connections shall be made in accordance with methods set forth within these Rules and Regulations.

The building lateral and its maintenance and/or repair, is solely the responsibility of the landowner from Authority's curb cleanout to the building.

All sewers shall be designed to meet the New Jersey Department of Environmental Protection's slope standards at N.J.A.C. 7:14A-23.6(B).

Inverted siphons and force mains shall be constructed with accommodations for flushing.

Easements shall be in a form approved by the Authority or the Authority's Engineer and Attorney. Easements shall be required for all sanitary sewer lines which are not within a public right-of-way. Easements shall be a minimum of 20 feet wide for sanitary sewers that are not more than 15 feet deep. For sewers that are more than 15 feet deep, easements shall be a minimum of 26.14 feet wide. The depth of the sewer shall be measured from the design invert of the pipe to the surface of the proposed final grading.

Individual subsurface disposals systems shall comply with N.J.A.C. 7:9A-3.2 and 3.16.

26.4 Oversizing

When plans for future development necessitate oversizing or grade changes, the Authority may enter into an agreement with the applicant to address the fair share of the costs of improvements not required for the proposed development.

If the Authority requires the installation of a pumping station of greater capacity and/or depth than that capacity determined by the Authority as necessary to serve the applicant, the Authority shall pay said applicant the difference between the cost of the facilities necessary to serve the applicant and the facilities required by the Authority.

The Authority will not assess the increased cost, if any, of the Engineer's review and inspection fee when the increased cost of such review and inspection to provide facilities in excess of those necessary to serve the applicant results from an order of the Authority.

26.5 Application to the Ocean County Utilities Authority

If applicable, the applicant shall, as a condition of final approval from the Authority, prepare and submit to the Ocean County Utilities Authority, all required plans and specifications, Engineer's Report and the Ocean County Utilities Authority form in triplicate. The applicant shall prepare and submit the entire exhibit to the Ocean County Utilities Authority in the name of the Authority and be responsible for all costs associated with the application.

26.6 Application to the New Jersey Department of Environmental Protection

If applicable, the applicant shall, as a condition of final approval from the Authority, prepare and submit to the New Jersey Department of Environmental Protection, all required plans and specifications, Engineer's Report and the New Jersey DEP form(s) in duplicate. The applicant shall prepare and submit the entire exhibit to the New Jersey Department of Environmental Protection in the name of the Authority and be responsible for all costs associated with the application.

26.7 Shop and Working Drawings

Prior to construction, the contractor shall submit for approval, shop or work drawings of all items for sanitary sewer construction, especially concrete reinforcement materials fabricated for the project and materials for which drawings are specifically requested. Such drawings shall show the principal dimensions and construction details. When it is customary to do so, or when the dimensions are of particular importance, the drawing shall be certified by the manufacturer as correct for this project. No material shall be purchased or fabricated for equipment until the

Authority's Engineer has approved the shop or work drawings. No work shall be done upon any part of a structure where a shop or working drawing is required until the Authority's Engineer has given such approval. All shop or work drawings shall be submitted in six (6) copies to the Authority.

The approval of shop or working drawings, will be general and shall not relieve the applicant from responsibility for details of design, dimensions, etc., necessary for proper fitting and construction work.

26.8 Pump-Out Facilities

Prior to construction of pump-out facilities for sewage stored in holding tank on boats, recreation vehicles or otherwise, application shall be made to the Authority for approvals in accordance with the procedures and fee schedules provided by the Authority for any real estate development. Detailed plans and specifications shall be submitted for review and approval in accordance with existing Rules and Regulations.

Pump-out facilities may be either permanently installed or portable, subject to review and approval by the Authority.

The user of any such facility shall not introduce any material into the sanitary sewer collection system that may be detrimental to the treatment process or the collection system.

All pump-out facilities shall provide pre-treatment of the sewage to eliminate odors or hydrogen sulfide content that exceed the standards as established by the Ocean County Utilities Authority. Pre-treatment processes may include aeration, chlorination or the use of chemical oxidants such as hydrogen peroxide, potassium permanganate or ozone.

If the pump-out facility requires a pump or lift station to transport the sewage to the Authority's collection system, then the pump or lift station must be separate and independent from the "pump-out" facility which shall not be used for the dual purpose of emptying the holding tank and transporting sewage to the collection system.

All pump-out facilities must be inspected and approved by the Lacey MUA, Township Plumbing and Building Inspection Departments. Backflow prevention devices shall be installed to protect the potable water supply at pump-out stations. Safety features must be installed to prevent sewage spills due to pump failure or when disconnecting the pump-out hose. A means shall be provided to flush out the entire system after each use.

The Authority shall have the right to terminate service if at any time the sewage quality is not in conformity with its regulations.

The force main connection to the sanitary sewer shall include a curb stop shutoff at the point of discharge. The make, model, and a detailed specification of the pump-out facility shall be submitted to the Authority's Engineer for approval.

The property owner shall be responsible to own, operate and maintain the sewage pump-out facility including compliance with all State regulations as may be promulgated from time to time. Authority personnel shall be granted access for inspection of the condition and operation of the sewage pump-out facility. To prevent damage to or impairment of the Authority's sanitary sewer system, the Authority reserves the right to specify certain required operation and maintenance procedures from time to time that the property owner shall be obligated to comply with. These requirements shall be incorporated into the property deed. The applicant shall submit a copy of the sample property deed to the Authority at least thirty (26.14) days prior to construction. The applicant shall furnish the Authority with a copy of the filed property deed upon completion of the project.

A separate sewer connection fee will be submitted for each sewage pump-out facility. For the purposes of the connection fee, the connection will be rated as a single equivalent service unit or any other fee that may be in effect at the time of application. If applicable, a surcharge for suspended solids content in excess of allowable limits may be levied.

26.9 Grinder Pumps/Sewage Ejector Systems

A grinder pump/sewage ejector system may be considered for individual dwelling units where connection to the sanitary sewer system cannot be achieved with a gravity connection. The

Authority will make a determination as to the acceptance of a grinder pump/sewage ejector system on a case-by-case basis.

If it is determined that a grinder pump/sewage ejector system is required, the Lacey Township Plumbing Department will provide information verifying that the system is approved under the National Plumbing Code.

Should an applicant be given an approval permitting the installation of the grinder pump/sewage ejector system(s), it shall be owned, operated, maintained, repaired, and/or replaced by the property owner of record.

26.10 Excavations

Excavation shall not be carried below the required level. All excavations shall be kept free of water until the installation of the pipe has been completed and backfilling of the excavation is completed. Excess excavation below required level shall be backfilled with $\frac{3}{4}$ " crushed stone as directed by the Lacey Municipal Utilities Authority.

Unstable soil shall be removed and replaced with $\frac{3}{4}$ " crushed stone or crushed slag which shall be thoroughly tamped. The Lacey Municipal Utilities Authority will determine what constitutes unstable soil and will specify the amount to be removed and replaced.

All applicable OSHA Rules and Regulations shall be followed.

26.10.1 Trench Excavation

Width of the trench at the top of the pipe shall be 6" minimum, 8" maximum, on each side of the pipe coupling. The bottom of the trench shall be rounded so that an arc of the circumference equal to 0.5 of the outside diameter of the pipe rests on undisturbed soil. Coupling holes shall be excavated accurately to size by hand. If a trench box is used, the bottom edges of the box shall at no time be below the proposed invert elevation of the pipe.

26.10.2 Bracing and Shoring

The contractor shall do all bracing, sheeting, and shoring necessary to perform and protect all excavation as required for safety of the workers, public, existing utilities, structures, pavements, and public and private property. When the sheet piling is driven below the bottom of the pipe or the structure, the Authority Engineer may direct the contractor to leave the sheeting in place.

26.10.3 Maintenance of Traffic

All work shall be performed in a manner that will ensure the least obstruction to traffic. The contractor shall at all times conduct his operation with not only the motorists' safety in mind, but also of the pedestrians and his own employees.

The requirements of the Agency having jurisdiction over the road in which the contractor is working shall govern. Emergency vehicles shall be provided access at all times.

The contractor is responsible for submitting traffic control plans and acquiring all road opening, traffic detour, and road closing permits.

26.10.4 Backfilling

Backfilling shall be done with approved materials free from large clods or stones. All unsuitable materials shall be removed from the site.

Backfill materials in trenches shall be placed evenly and carefully around and over pipe in 6" maximum layers. Each layer shall be thoroughly and carefully tamped until one foot of cover exists over pipe.

The remainder of backfill materials shall be placed in one foot lifts maximum, moistened if necessary, and compacted in areas not to be paved (utility easements). No compacting shall be done when the material is too wet.

All forms, trash, and debris shall be removed and cleared away from manholes and other structures. Approved backfill material may be from excavation or borrow. It shall be free from rocks, lumber, debris and frozen material. Backfill materials shall be placed symmetrically on all

sides in 8" maximum layers. Each layer shall be moistened and compacted with mechanical or hand tampers. In roadway or area to be paved, each layer shall be compacted to density equal to that of adjacent original materials, so that pavement can be placed immediately. Minimum compaction shall be 95% Standard Proctor density.

The trenches shall be backfilled at the end of each workday, except when the conditions require them to be left open overnight. When the trenches are left open overnight, temporary fencing shall be built around them.

Even though testing may indicate that the required density has been attained, the contractor will be responsible for correcting any settlement or damage to the utilities.

The Authority may require the applicant to provide an opinion of a professional engineer regarding the suitability of the on-site material to be used as backfill, subject to review and approval of the Authority Engineer.

Where the on-site material is deemed suitable, the opinion shall specify the appropriate installation methods for the material. Where the on-site material is deemed not suitable, the opinion shall specify modification or replacement of the material and the appropriate installation methods for the specified material.

26.10.5 Cleanup and Restoration

All excess material, trash, wood forms, and other debris will be cleaned up and disposed of properly. Asphalt debris from trench excavations shall be properly disposed of at an approved disposal facility and trip tickets supplied to the Authority for documentation. All areas shall be restored to their original condition or as required by the Ocean County Soil Conservation District.

26.10.6 Pavement Restoration

Existing pavement shall be restored in accordance with the rules and regulations of the agency having jurisdiction over the roadway. Said agency will determine if the roadway has been restored adequately.

26.10.7 Dewatering

Dewatering shall be accomplished by methods which ensure that the groundwater will be drawn down to an elevation two (2) feet below the bottom of the bedding. Upon removal of well points, deep wells or other dewatering equipment, the contractor shall backfill, compact, and pave where required. Well point and deep well holes shall be compacted for the full depth to a density equal to in-situ soils.

Dewatering for the structures and pipelines shall commence when groundwater is first encountered and shall be continued as long as the trench is open.

26.10.8 Erosion Control

Erosion control measures taken at the site shall be in full conformance with and meet all requirements of the "Standards for Soil Erosion and Sediment Control – New Jersey State Soil Conservation Committee."

A compliance certificate from the Ocean County Soil Conservation District shall be submitted to the Authority.

26.11 Piping

26.11.1 Handling

Pipe, fittings and accessories shall be handled with care and shall not be dropped or bumped against pipe or appurtenances already on the ground or against any other object on the ground. The contractor's methods for installation and handling of pipe, fittings and accessories shall conform to the pipe manufacturer's recommendations and AWWA C-600 Standard.

26.11.2 Cleaning

The interior of all pipe, fittings and accessories shall be thoroughly cleaned of all foreign matter before being installed and shall be kept clean until the work has been accepted. All joint contact surfaces shall be kept clean until the jointing is completed.

Every precaution shall be taken to prevent foreign material from entering the pipe during installation.

Groundwater shall not be allowed to rise around the pipe until the trench is backfilled and the grading is completed. Dewatering operations must be continuous for as long as the trench is open.

Whenever pipe laying is stopped, the open end of the pipe shall be closed with a snug-fitting plug.

26.11.3 Bedding and Pipe Installation

Bedding material shall be broken stone, free from silt, clay or organic material, and shall conform to the requirements of the New Jersey State Department of Transportation Standards for No. 57 coarse aggregate.

Pipe shall be bedded true to line and grade, and no blocking shall be used to bring the pipe to grade. Class "C" bedding shall be used for all pipes. Class C bedding shall be defined as that method of bedding sewers in approved granular material with a shaped bottom in undisturbed earth so as to fit the lower part of the pipe, for a width of at least 50% of the sewer diameter; and in which the remainder of the sewer is surrounded to a height of at least 0.5 feet above its top with approved granular materials, shovel placed and tamped to completely fill all spaces under and adjacent to the sewer; all under the inspection and approval of the Authority.

PVC sewer pipe shall be laid carefully to the lines and grades shown on the drawings or as directed by the Authority, and shall conform accurately thereto after the completion of the sewer. Particular care shall be taken that there is no sagging of the spigot at the joint, and that a true and even surface of the invert is obtained throughout the entire length of the sewer.

Where the sewer is to be laid without a special foundation, the earth forming the bed shall be free of large stones. The pipe shall then be evenly bedded in the earth, great care being taken to remove only enough of the earth to leave a uniform bed for the entire length of the pipe, except the bell, under which a recess shall be excavated to a sufficient depth to relieve it of any load and to allow ample space for making the joint. In case the bed shaped in the bottom of the trench is too low, earth must be thrown into the bottom and thoroughly compacted and new bed shaped for the pipe. It is unacceptable to raise the grade of the pipe by ramming earth beneath it. When the pipe has been bedded satisfactorily and the joint made, the recess around the bell shall be refilled with soil and enough soil shall be refilled and tamped on each side of the pipe to hold it securely in place, care being taken not to disturb the position of the pipe during this process.

Concrete cradle, where required, shall be constructed as directed. The concrete for the full width of the foundation shall be deposited continuously to the height of the outside bottom of the pipe. Before this concrete is set, the pipe shall be evenly bedded therein, so as to have a uniform support for its entire length and the remainder of the concrete shall be immediately deposited in such a manner as to avoid changing the position of the pipe.

Concrete cradle shall be allowed to harden sufficiently to prevent consolidation of backfill, and wet concrete cradle shall be allowed to cure 24 hours before vehicle loads can be applied to that area of the trench. Steel plates may be used to cover the trench to protect the cradle from vehicle loads if the 24-hour undisturbed cure period cannot be provided.

Each pipe shall be laid so as to form a close joint with the next adjoining pipe, and bring the inverts continuously to the required line and grade.

Where the sewer is to be laid below groundwater level, it shall be laid on $\frac{3}{4}$ " crushed stone foundation, and the stone shall be deposited for the full width of the trench to the height of the outside bottom of the pipe. The pipe shall then be bedded on this material and the remainder of the crushed stone deposited and carefully tamped so as to avoid disturbing the pipe but giving a uniform support to its entire length.

The installation of PVC sanitary sewer pipe shall conform to the requirements of ASTM Specification D2281, or latest revision, for "Standard Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe.

Extreme care is to be exercised in the placement of backfill around PVC sewer pipe. The most important factor affecting pipe performance and deflection is the placement of backfill between the invert of the pipeline and a level 12" above the top of the pipe. Material shall be placed and consolidated in this area to provide adequate side support to the pipe while avoiding both vertical and lateral displacement of the pipe from proper alignment.

26.11.4 Sewer Pipe

Materials used in the construction of gravity sewers shall be polyvinyl chloride (PVC) or ductile iron pipe (DIP). Inverted siphons and force mains shall be constructed of ductile iron pipe unless otherwise permitted by the Authority. Inverted siphons shall consist of a minimum of two (2) parallel pipes with provision for flushing, and flow control gates provided. All sewer pipe installed with less than three (3) feet of cover, or greater than twenty (20) feet of cover or within ten (10) feet of an open stream or culvert, or crossing a stream, must be of ductile iron.

All standard specifications referred to herein, such as ASA, ASTM, AWWA and the like, shall be the latest revision thereof, at the time of application for final approval.

26.11.5 Ductile Iron Pipe

Ductile iron pipe shall be centrifugally cast in metal molds in accordance with ANSI/AWWA C151/A21.51 (push on pipe), and C115/A21.15 (flanged joints). Thickness shall be designed in accordance with ANSI/AWWA C150/A21.50 and shall be a minimum of Class 52. The weight and class shall be conspicuously indicated by the manufacturer on the outside of the pipe. It shall be lined for corrosion resistance in anaerobic conditions with SewperCoat® as manufactured by Griffin or equal. Joints shall be gasketed push-on in conformance with ANSI/AWWA C111/A21.11. The exterior of the ductile iron pipe shall be covered with an asphaltic coating in accordance with ANSI/AWWA C151/A21.51. In aggressive soils, ductile iron pipe wrapped in polyethylene, in accordance with ANSI/AWWA C105/A21.5, shall be used. The Authority Engineer will make the determination.

All exposed sewage piping at the pump station, in the wet well and valve pit, shall have flanged joints conforming to ANSI B16.1.

26.11.6 Polyvinyl Chloride Pipe (PVC)

PVC sewer pipe shall have bell and spigot ends and O-ring rubber gasketed joints. PVC pipe and fittings shall conform to ASTM D26.1434, with a minimum wall thickness designation of SDR 35. Each pipe shall not vary in length more than 1.0 inch in a length of 12.5 feet measured as mid-ordinate.

The plastic material from which the pipe and fittings are extruded shall be impact types of PVC, unplasticized, having high mechanical strength and maximum chemical resistance conforming to Type 1, Grade 1 of the specification for rigid polyvinyl chloride compounds, ASTM D1784.

Pipe shall be free from defects, such as bubbles or other imperfections, in accordance with accepted commercial practice. Test results demonstrating that the pipe meets ASTM D2444 for impact and ASTM D2281 for deflection and pipe stiffness, shall be provided when requested by the municipality or utility authority.

Joints shall conform to ASTM D2812. Rubber ring gaskets shall conform to ASTM F477. The gasket shall be the sole element depended upon to make the joint watertight.

The pipe shall be installed as specified in ASTM D2281. In no case shall less than a Class III material be used for bedding and haunching material, unless approved in writing by the municipal engineer or utility authority engineer. Particular attention should be given to the special requirements for installing pipe in unstable soil or excessive ground water. When installing pipe in unstable soil or excessive ground water, a determination regarding special precautions, such as poured concrete slabs, shall be made by the design engineer for review and approval by the authority engineer.

Trench cross sections shall comply with the bedding details contained herein.

Rubber ring gaskets shall be manufactured as per ASTM D1869, and shall meet physical and chemical test requirements of federal specification ZZ-R-601a. The gasket shall be the sole element dependent upon to make the joint watertight.

No pipe shall be installed with less than four (4) feet of cover without special bedding and the wall thickness of the pipe shall be increased to the designation of SDR 18.

26.11.7 Joints

Joints for sewer pipes shall be as specified below:

Ductile Iron Pipe – Rubber gasket equal to Tyton or mechanical joint.

PVC Pipe – Bell and Spigot with rubber ring.

26.11.8 Fittings

Fernco type connectors are not permitted for permanent installations, but may be used for temporary repair work. For PVC Gravity sewer mains, and laterals PVC fittings in accordance with Section 26.11.9 shall be used. For force mains and Ductile Iron mains and laterals, ductile iron fittings in accordance with Section 26.11.10 shall be used.

26.11.9 PVC Fittings

The fittings shall comply with ASTM D-26.1434 and F-1336. The material of each fitting shall comply with ASTM D-1784. The joints shall be push on and shall comply with ASTM D-2812. The gaskets shall comply with ASTM F-477. The wall thickness shall comply with SDR-35. The fittings shall be installed in accordance with ASTM D-2281. The fittings shall be as manufactured by the Harrington Company (HARCO) or equal.

26.11.10 Ductile Iron Fittings

Where transitions to flanged fittings are made, adapters approved by the Authority shall be used. Compact Mechanical Joint Ductile Iron fittings shall comply with ANSI/AWWA C153/A21.53 and ANSI/AWWA C111/A21.11. Thickness shall be designed in accordance with ANSI/AWWA C150/A21.50 and shall be a minimum of Class 52. The fittings shall be lined for

corrosion resistance in anaerobic conditions with SewperCoat® as manufactured by Griffin or equal. Joints shall be mechanical joint in conformance with ANSI/AWWA C111/A21.11. The joints shall be restrained by "GripRing" as manufactured by Romac Industries, Inc. The gland shall be ductile iron per ASTM A536 Grade 65-45-12. The gasket shall be styrene butadiene rubber (SBR) per ASTM D2000 MBA 710, compounded for water and ANSI/AWWA C111/A21.11. The exterior of the ductile iron pipe shall be covered with an asphaltic coating in accordance with ANSI/AWWA C151/A21.51. In aggressive soils, ductile iron fittings wrapped in polyethylene, in accordance with ANSI/AWWA C105/A21.5, shall be used.

26.12 Bedding

26.12.1 Class C Ordinary Bedding

Class C Ordinary Bedding shall be defined as that method of bedding sewers in which the sewer is bedded on approved granular material with ordinary care in an earth foundation shaped in undisturbed earth so as to fit the lower part of the sewer exterior with reasonable closeness for a width of at least 50% of the sewer diameter, and in which the remainder of the sewer is surrounded to a height of at least 0.5 feet above its top with approved granular materials, shovel placed and tamped to completely fill all spaces under and adjacent to the sewer, all under the general direction of a competent engineer and with frequent inspection by a competent inspector during the course of construction.

26.12.2 Class B First Class Bedding

Class B First Class Bedding shall be utilized where applicable as approved by the Engineer. The bedding shall conform to the detail shown herein.

26.12.3 Concrete Cradle Bedding

Concrete Cradle Bedding is that method of bedding sewers in which the lower part of the sewer exterior is bedded in 3,000 psi. concrete, without reinforcement, having a minimum thickness under the pipe of one-fourth its nominal internal diameter (4" minimum) and extending upward to a height equal to one-fourth of the nominal outside diameter.

26.12.4 Concrete Encased Pipe Bedding

Concrete Encased Pipe Bedding is that method of bedding sewers in which the entire sewer exterior is encased in 3,000 psi. concrete or better, minimum 6 inches of concrete all around.

26.13 Manholes

Manholes shall comply with the standards of ASCE Manual on Engineering Practice No. 37.

Manholes shall be precast concrete or concrete block. Concrete block shall be coated with two (2) coats of portland cement mortar.

Manholes shall be provided at ends of sewer lines, at intersections and at changes of grade or alignment. Distances shall not exceed 400 feet. Where sewer service connections enter manholes, and the difference in crown elevation between the incoming and outgoing pipes is equal to or greater than 2 feet, drop pipes shall be provided and external drop manholes shall be built.

26.13.1 Precast Concrete Construction

Precast concrete manholes shall consist of precast reinforced concrete section, a conical or flat slab top section, and a base section conforming with the typical manhole details.

Precast manhole sections shall be manufactured in accordance with ASTM Designation C478, with round rubber gasketed joints conforming to ASTM C361 and ASTM C443. Maximum absorption shall be nine (9%) percent, in accordance with ASTM C478, method A. The top riser section of precast manholes shall terminate less than one (1) foot below the finished grade to provide for proper adjustment. The minimum compressive strength of the concrete for all sections shall be 4,000 psi. The circumferential steel reinforcement for rise pipe, cone sections, and base walls shall be a minimum of 0.12/sq. in. per linear foot. Reinforcing in both layers of steel of the flat slab top sections and in the bottoms of bases shall be a minimum of 0.12/sq. in. per linear foot in both directions.

Joints of the manhole sections shall be formed entirely of concrete employing a round rubber gasket and, when assembled, shall be self-centering and make a uniform watertight joint. Except for those surfaces within the gasket groove, all inside surfaces of the bell or outside surfaces of the spigot, or both, on which the rubber gasket may bear during the closure of the joint and at any degree of partial closure, shall be parallel within one degree and have an angle of not more than two degrees with the longitudinal axis of the pipe. In joints formed entirely of concrete, the distance from either side of the gasket to the end of the bell or spigot shall not be less than $\frac{3}{4}$ ". The gasket spaces between the bell and spigot shall be so shaped as to provide either grooves or shoulders that will prevent the gasket from disengaging from its compression surface or being blown out by hydrostatic pressures. The gasket shall be the sole element utilized in sealing the joint from either internal or external hydrostatic pressure.

Each section of the precast manhole shall have not more than two holes for the purpose of handling and laying. These holes shall be tapered and shall be plugged with rubber stoppers or mortar after installation.

Precast base sections shall be installed on a firm stabilized foundation or on crushed stone as directed by the Engineer.

Precast base sections may be supplied by the manufacturer with inverts precast, or the inverts may be cast in the field by the contractor. Inverts shall be smooth and accurately shaped to a semi-circular bottom conforming to the inside of the adjacent sewer sections. Changes in direction of the sewer and entering branches shall have a circular curve of as large a radius as the manhole will permit.

Cracked manholes shall not be used.

26.13.2 Doghouse Manholes

Doghouse manholes shall be constructed as shown in the details and conform to the section, "Precast Concrete Construction," with the following exceptions:

Manhole riser section shall be placed on a preconstructed concrete slab placed under the existing sewer pipe. Base slab shall be 6" thick (minimum) and shall be 1' in diameter larger than the manhole to be constructed.

Existing pipe shall be saw-cut to expose channel only after new sloped bench has been constructed.

26.13.3 Manhole Steps

Manhole steps shall be of 6061-T6 aluminum drop front type as manufactured by Alcoa Aluminum Co., as specified above, or copolymer polypropylene plastic with minimum ½" diameter grade 60 steel reinforced encasement within. Plastic steps shall be a minimum of 12 1/8 inches wide and possess a non-slip contact surface. Plastic steps shall be model PS4-B by M.A. Industries or equal. All steps shall be built into walls of the precast sections to set in straight alignment so as to form a continuous ladder with a maximum distance of 12" between steps. The maximum distance between the first step and the rim of the manhole shall be 24" and minimum distance 16".

26.13.4 Manhole Frames and Covers

All manhole castings shall conform to ASTM A-48 Class 26.14 and be suitable for H-20 loading capacity. Standard manhole frames and covers shall be Pattern #1202B as manufactured by Campbell Foundry, Bridgestate Foundry or equal. The only locking type of manhole permissible is Pattern #1486 as manufactured by Campbell Foundry, Bridgestate Foundry or equal. Watertight manhole frames and covers shall be Pattern #1486 as manufactured by Campbell Foundry, or Bridgestate Foundry, or equal. The letters "LMUA" shall be cast integrally into the cover.

All casting for manhole frames and covers shall be close-grained, tough gray iron, free from cracks, holes, swells, and shrinkage distortion. All manhole castings shall be made accurately to the pattern and to the dimensions specified with carefully machine-milled bearing surfaces. Allowances shall be made in the patterns so that specified thickness shall not be reduced. All covers which "rock" and do not lie solid after construction is finished will be rejected and shall

be replaced by adequate covers at no additional cost to the Authority. No plugging, burning-in or filling will be allowed.

Watertight manhole covers shall be installed on manholes where the USGS elevation of the manhole rim is less than 10.0 or where the rim is less than 8.0 feet above the bed of an adjacent stream, or where manholes are in easements and outside of paved areas, or located in the gutter lines.

26.13.5 Manhole Coatings

All existing manholes that will be connected to by means of a drop connection or a force main shall be vented and the interior shall be coated as indicated below.

All new Manholes shall be coated as follows:

Interior Coating

After each channel has cured for a minimum 26.14-day period, prepare surface for painting as recommended by the paint manufacturer. The walls, channels and benches shall receive two coats of an epoxy coating, for a total dry film thickness of 12 mils. The benches shall receive an additive for non-skid. The coating shall be "Ceramic White" as manufactured by Atlantic Concrete", Epoxide as manufactured by Con-Lux, Sikagard 667 as manufactured by Sika Chemical Corporation, or equal.

Exterior Coating

The outside of each manhole/structure shall be coated with two coats of Enviro-Green as manufactured by Atlantic Concrete, Bitumastic No. 26.140-M coal tar epoxy as manufactured by Kop-Coat, or equal with a minimum total dry fill thickness of 10.0 mils.

26.13.6 External Drop Manholes

Where the influent pipe invert is greater than two (2) feet higher than the manhole invert, an outside drop shall be required. An outside drop connection shall be constructed in accordance

with the details. Outside drop manholes shall be the typical drop type connection. All elbows and tees are to be made for sanitary sewage use and have a sweep form as opposed to a sharp tee entry. The drop assembly is to be secured with concrete to the manhole assembly so they will settle as a unit.

26.13.7 Internal Drop Manholes

An inside drop connection may be accepted subject to Authority approval for unusual situations.

In those cases where inside drop manhole is allowed to accommodate a change in elevations (inverts), the drop may be internal if the manhole is five (5') feet inside diameter and approved by the Authority in tentative application phase.

The inside drop pipe must be the next larger size diameter available. Example: An 8" collection pipe uses a 10" drop, and a 10" collection pipe uses a 12" drop.

The drop pipe must be securely fastened to the manhole wall with stainless steel straps and bolts every three feet. The drop section must terminate in such a fashion that sewage is not splashed about. Entry shall be smooth, and the use of a flared channel and elbow is mandatory. The drop shall not hamper access.

26.13.8 Connections to an Existing Manhole

The following requirements shall be met when connecting to an existing manhole, whether it is owned by the Authority or the Ocean County Utilities Authority:

During installation of the gravity sanitary sewer, the contractor shall allow no debris to enter the pipe. Flushing of the collection system into the existing pipe shall not be permitted. A concrete bulkhead is to be temporarily installed in the connecting manhole.

The owner of the manhole shall have the final say as to the approval or disapproval of any work done by the contractor when making the connection.

Any settlement occurring over the connection made to the manhole shall be the responsibility of the contractor.

The owner of the manhole shall receive at least two (2) business days notice prior to any work done on the connection. No work shall be covered until it has been approved by the Authority owning the manhole.

If a stub or knockout bulkhead has not been provided at the manhole, the connection shall be made with a coring machine and a watertight neoprene gasket suitable for use with sanitary sewage, with stainless steel clamps. The use of pneumatic hammers, chipping guns, sledgehammers, or other means of providing a connection shall not be permitted under any circumstances.

26.13.9 Internal Drop Connection to an Existing Manhole

An inside drop connection shall be made with the following additions:

Drop pipe must be into manhole bench such that the bottom of the pipe is three (3) inches below existing bench, to allow for three inches of concrete around the pipe.

The maximum distance between the invert of the influent pipe and invert of the effluent shall not exceed 10 feet.

When drop pipe is over 15-inch diameter, it must be filament wound or fiber reinforced pressure pipe of 125 psi. rating.

26.13.10 Manhole Accessibility

All manholes located in easements or off the paved right-of-way shall be accessible for servicing by the Authority Jet-Vac vehicle. The applicant shall submit for approval a procedure for stabilizing the access way.

26.14 Connections, Laterals and Cleanouts

Service connections, laterals and cleanouts shall comply with the following:

The house connection or lateral from the street main to the cleanout shall be considered an integral part of the sanitary sewer system. The type of material used for the house connection shall be as follows: four (4) inch cast iron soil pipe, extra heavy; four (4) inch PVC pipe, SDR 35; or four (4) inch ductile iron pipe. Common laterals for multi-family units shall be designed to have adequate conveyance capacity.

Wye connections shall be the same material as the sewer main. Saddles shall be used only for connection to an existing main.

Bends in house connection lines shall be made using standard fittings. A riser with a threaded cleanout cap, shall be provided in the lateral and located between the curb and sidewalk. Cleanout caps shall have a depressed or inverted nut. Where curbs or sidewalks do not exist, the lateral cleanout shall be located between the edge of the pavement and property line or within a designated easement as determined by the Authority. Lateral cleanouts shall not be located in sidewalks or driveways.

For purposes of future location of the cleanout, 12" long, # 4 rebars shall be installed, next to the cleanout, one installed on the street side and one on the house side of a cleanout cap. The location of the service connection is to be shown by cutting an "H" into the curb.

Flexible rubber couplings between the sewer pipe and the cleanout at the curb are not acceptable.

House connections shall be made in accordance with the Authority's typical house connection detail. The connection shall be made by use of a sanitary tee wye or a wye and 1/8 bend at the sewer pipe, thence in a horizontal direction to the lateral. The service connection cleanout is to use a wye and a 45° elbow or a 45° tee-wye combination to connect the riser pipe. Most pipe diameters are four inch; however, a larger size might be required where the four-inch will not accommodate the flow.

A minimum pitch of 1/4 inch per foot is to be used on four-inch service connections. Pipe material is to be SDR-35 with double gasket type push-on coupling.

No lateral connections past the curb or property line shall be made before the sewer has been inspected, tested and approved by the Authority.

Connections beyond the cleanout are under the jurisdiction of the Plumbing Subcode of the Uniform Construction Code (N.J.A.C. 5:23-3.15) through the Plumbing Subcode official. The pipe size and specifications shall comply with the regulations and requirements of the Plumbing Subcode of the Uniform Construction Code. Inspection and approval of the installation of the building lateral from the curb cleanout to the building is under the jurisdiction of the Township Board of Health acting through the Township Plumbing Inspector.

Deep-house connections and encasement chimneys shall be used where the invert of the sewer is greater than ten (10) feet below the finished grade.

Service connections shall be installed along development off-site main lines to serve all individual properties along the route. The Applicant shall submit to the Authority the contractor's cost proposal for the installation of the off-site service connections for the Authority's review no later than thirty (26.14) days prior to commencement of construction. Upon agreement between the Authority and the Applicant, the costs for the installation of said service connections will be reimbursed by the Authority upon, written request by the Applicant, certification of the completion of the work by the Authority's Engineer and approved by the Authority.

26.15 Pump Stations

The sections below and associated drawings are meant as guidelines and requirements of the Authority. These regulations are not intended to replace the design by a licensed Professional Engineer.

26.15.1 General

The use of pumping stations in new developments is strongly discouraged by the Authority. The Authority encourages the use of alternative methods to avoid the installation of pumping stations

wherever possible. Where in the opinion of the Authority's Engineer, an alternative method is available, a pumping station will not be approved. Sanitary sewer pumping stations shall be considered where gravity system design leads to excessive sewer depths which are not economically justifiable. Should the need for a pumping station present itself, the Authority will make a determination as to the acceptance of such facility on a case-by-case basis. All Pumping Stations shall comply with N.J.A.C. 7:14A-23.10, 23.11 and 23.12.

Force main velocities shall not be less than 2 feet per second at normal pumping rate.

All pumping stations shall be the submersible pump type. All confined space areas where access is required shall be provided with gas monitors acceptable to the Authority's Engineer.

The minimum interior diameter of any wet well shall be six (6) feet. Normally, the capacity of the wet well shall be 10 minutes flow at the average daily flow rate.

An auxiliary source of power housed in a superstructure to conform to the neighborhood architecture shall be provided for all electrically driven pumps, unless waived by the Authority. An automatic transfer switch that senses a power failure and starts the generator within one minute must activate the generator. When power returns to normal, the generator will go off line and begin a five-minute cool down run at no load.

For duplex pump stations, the solid-state controller shall be Duplex Pump Control System II-5. Automatic sound alarms shall be installed independent of station power and they shall give warning of high and low water and power failure. These alarms shall be connected to the Authority's master alarm panel via an automatic telephone dialing system by RACO-VERBATIM or approved equal.

The wet well level shall be monitored and maintained by a stainless steel submersible level sensor.

26.15.2 Lot

Each pump station must be on a minimum 100'X 140' sized lot. The size of the property shall be able to accommodate all of the components of the pump station, landscaping and have room

to replace the station in the future. The Authority reserves the right to increase or decrease the size of said lot.

26.15.3 Grades

The plans shall include contour lines for each foot, spot elevations and the flood elevation.

26.15.4 Fence

The entire site of the pump station shall be enclosed by a six-foot (6') fence. The fence shall be located approximately six feet from the property line, to allow the landscaping used to screen the pump station, to be located on property owned by the Lacey Municipal Utilities Authority. The fence shall be either a green vinyl coated chain link fence with barbwire and green vinyl coated poles. There shall be a swing gate for personnel and a double swing gate for the driveway.

26.15.5 Driveway

The paved driveway shall be a minimum twelve feet (12') wide and have a total thickness of eleven inches (11"), being 6" r-blend, 3" of stabilized base and 2" FABC top.

26.15.6 Landscaping

The pump station shall be screened by using six foot (6') high White or Black Pine trees, or equal, to prevent adjacent homeowners from having to view the pump station. The spacing of the trees/shrubs shall be such that within one year the plants will screen the pump station. The pump station shall be visible from the road. The landscaped area outside of the fence where the screening is provided shall be covered with 4" – 6" of mulch or wood chips. The remaining portion of property located outside of the fenced area shall either be seeded or receive sod. The remaining portion of the interior of the fenced area which is not concrete or paved shall be covered with 3"- 4" of ¾" Delaware River Bed Stone over filter fabric.

26.15.7 Site Lighting

Pole mounted motion sensitive site lighting shall be provided. It shall be positioned to provide sufficient illumination for site security and to perform work on-site at night without additional lighting. The lights should not produce glare or unwanted illumination on the adjacent properties. There shall be an on/off switch for the light in the control box and explosion proof lights shall be installed in the wet well and valve pit. These explosion proof lights shall be operated by intrinsically safe switches in the valve pit and wet well.

26.15.8 Wash Down Hydrant

Each pump station shall be provided with a non-freezing wash down hydrant with a standard ¾" hose outlet. The water service for the hydrant shall be a minimum one-inch. All of the components of this service shall correspond with the requirements of a typical water service, with the addition of a backflow prevention valve. The meter shall be located in the same chamber as the backflow prevention valve.

26.15.9 Wet Well

Wet wells shall be constructed of pre-cast concrete, having a minimum internal diameter of six (6) feet. The exterior shall be coated with coal tar epoxy and the interior shall be coated with white epoxy. The interior of the base shall be sloped. For pump stations which contain pumps less than 10 HP, the sloped base shall contain a prefabricated fiberglass base insert as manufactured by ITT Flygt. The wet well shall be set upon a bed of 12" of ¾" crushed stone. The base section of the wet well shall have a ledge to facilitate the construction of an anti-flotation collar. Wet well sections shall be designed in accordance with ASTM C-478, with a minimum compressive strength of 4,000 psi. The joints shall be gasketed in accordance with ASTM-361.

26.15.10 Screening

All influent in the wet well shall be screened. For 12" influent pipes and smaller a stainless steel bar style trash basket series B4B by Halliday shall be provided. The screen must be removable using an attached chain and ride on a track system which allows removal from outside of the wetwell. The influent pipe shall extend to the ladder but shall not interfere with the use of the

ladder, and the ladder shall not obstruct the flow of sewage. Influent pipes larger than 12" shall be screened by a muncher comminutor, as manufactured by Monoflo. The comminutor shall be in-line in the wet well. When a comminutor is used a separate hoist shall be installed to raise and lower the comminutor. Regardless of the size of the influent pipe all pump stations which receive flow from either an active adult community or a health care facility, shall screen the influent pipe by means of a comminutor.

26.15.11 Sensors

The level of the wet well shall be monitored and maintained by a stainless steel submersible level transducer in a stilling well. The sensor shall have settings for low water level, pumps off, lead pump on, lag pump on and high water level. There shall also be a mercury float for a back up sensor for the high water level. This back up float shall also turn both pumps on.

26.15.12 Alarms/Autodialer

Automatic audible and visible alarms shall be installed independent of the station power, and they shall be set for low water level, high water alarm, generator running, loss of normal power, and reverse flow. These alarms shall be connected to the Authority's master alarm panel via an automatic telephone dialing system by a 16 channel Verbatim RACO auto dialer or approved equal.

26.15.13 Pumps

Each pump station shall have a minimum of two pumps. Each pump shall be designed to handle peak flows equivalent to 2.5 times the average daily flow. If more than two pumps are used, their capacities shall be such that upon failure of the largest pump, the others will handle the peak flow. The pumps shall be submersible, explosion proof, non-clog wastewater pumps, as manufactured by Barnes or an approved equal. A flush valve shall be supplied on a minimum of one pump. Each pump which does not have a flush valve shall have all of the necessary hardware to receive said valve. Force main velocities shall not be less than two feet per second.

The wiring for the pumps shall use the plug system verses a junction box.

The pumps shall use a stainless steel chain for attaching the pump to the chain from the hoist.

A stainless steel anchor, embedded in the concrete top of the wet well shall be provided for anchoring the chain in between lifts of the pumps, and a stainless steel hook shall be provided in the wet well for hanging the chain attached to the pumps, when not being used to lift the pumps.

26.15.14 Piping

Ductile iron pipe shall be in accordance with Section 26.11.5, of these regulations. Ductile Iron Fittings shall be accordance with Section 26.11.10, of these regulations.

26.15.15 Valve Pit

The Authority's Engineer upon review of the plans shall determine the size of the rectangular valve pit. The valve pit shall have a minimum interior clearance of 6' 6". The valve pit shall be constructed of pre-cast concrete with compressive strength of 4,000 psi. The valve pit shall be installed on a bed of 12" of $\frac{3}{4}$ " crushed stones. The exterior shall be coated with coal tar epoxy, and the interior shall be coated with white epoxy. The floor of the valve pit shall be sloped to a drain flowing back to the wet well. The drain pipe shall be a minimum of 4" in diameter. A flapper or ball valve shall be utilized on the drain pipe to prevent the gases of the wet well from entering the valve pit. The entrance to the valve pit shall be between the two influent pipes.

The valve pit shall have two influent pipes from the wet well. On each pipe there shall be a check valve, plug valve and 90-degree bend prior to the pipes coming together at a cross. The leg of the cross heading between the two influents shall bend 90 degrees up towards the surface for emergency bypassing. On this leg there shall also be a plug valve. This valve shall be located as high as possible to allow operation from grade. The other leg of the cross will be the effluent. On the effluent leg there shall be a meter and sufficient pipe in accordance with the manufacturer's recommendations. After the effluent pipe has left the valve pit and there is sufficient pipe for the meter, an inline plug valve shall be installed with a valve box. The stub for by-pass pumping shall be located under a hatch or a separate hatch for the by-pass pumping shall be provided.

26.15.16 Check Valve

Check valves shall be the lever style as manufactured by DeZurik or Clow.

26.15.17 Plug Valve

Plug valves shall have a handwheel for operating. The plug valve shall be as manufactured by Clow or DeZurik. The wheel should be located approximately four feet above the floor, and there should be ample clearance between the wheel and any walls.

26.15.18 Grades

The effluent shall be metered by a MagMaster Plus MFF Series Electromagnetic Sensor, as manufactured by ABB Instrumentation or equal.

26.15.19 Ladder

A ladder shall be used to provide tracking for the trash basket and a means of ingress and egress into the wet well. The manufacturer of the ladder shall be the same as the trash basket to ensure compatibility. The ladder shall be supplied with the Series L1E Safety Extension as manufactured by Halliday.

26.15.20 Access Hatches

The size of the hatches shall depend on the size of the structure and the components of the pump station. The hatch shall comply with O.S.H.A. 1910.23 and 1910.146 for fall through protection and controlling confined space entry. The safety grate shall be rated to withstand a live load of 26.140 pounds per square foot. The safety grate shall have a separate lock from that of the cover. Hatches shall be the Safe Hatch as manufactured by ITT Flygt or equal.

26.15.21 Supply Fan

A supply fan must be provided. The fan must have the capacity to induce a minimum of twelve air changes per hour. The fan shall be located off to the side of the wet well to avoid conflicts with other items located on top of the wet well. The duct extending into the wet well shall extend to approximately two feet above the invert on the influent.

26.15.22 Vent

A 'candy cane' shaped vent on top of the wet well shall be provided. There shall be an insect/bird screen on the vent.

26.15.23 Hoist

The hoist shall be constructed of stainless steel. The hoist, winch, all mounting sockets, and all other components shall be of adequate strength and size to safely remove the pumps or comminutor from the wet well. The hoist for the pumps shall be permanently attached, whereas the hoist for the comminutor may be portable. The hoist shall have a manual winch.

26.15.24 Controls

The controls shall be designed to operate the number of proposed pumps. The controls shall provide for the operation of the pumps under normal circumstances. The controls shall alternate each pump at startup to equalize run time. In the event the flow coming in exceeds the capacity of the lead pump, the lag pump shall automatically be started. As the level of waste in the wet well goes down, the pumps shall turn off at the elevation indicated on the plans. Controls shall be located in a green NEMA 4X enclosure, manufactured of cold rolled steel supported by pressure treated wooden posts. The enclosure shall be of adequate size to accommodate all the components. The controls should be supplied by the same manufacturer of the pumps.

On top of the control panel shall be a red light in protective cage. Audible alarms shall also be supplied.

26.15.25 Electrical Service

For pumps of 5 HP and larger three-phase power with 440 volts shall be provided. For smaller pumps single-phase, 240 volts shall be supplied. A separate duplex outlet, not located in the control box, shall be supplied.

26.15.26 Generator

An auxiliary source of power shall be provided for all electrically operated devices. An automatic transfer switch that senses a power failure and starts the generator within one minute must activate the generator. When power returns to normal, the generator will go off line and begin a five-minute cool down run at no load.

The manufacturer shall be regularly engaged in the manufacture of similar items and with a history of successful production of a minimum of ten (10) years. The generator shall be as manufactured by Onan or Kohler or approved equal.

The generator shall be sized for the components of the pump station. The generator should be natural gas where available or turbo-charged diesel electric generating set with all standard equipment plus:

- a) Surface mounted enclosed circuit breaker
- b) Two (2) starting batteries and acid
- c) Lube Oil
- d) Anti-freeze
- e) Battery charger
- f) Vibration isolators
- g) Electric water jacket heater
- h) Twelve-light generator set monitoring system. Engine monitor with individual lights, lamp test switch, cycle cranking, and common external alarm contact indicating each of the following conditions:

- 1. Run (green light)
- 2. Overcrank Shutdown (red)
- 3. Overspeed Shutdown (red)

4. High Coolant Temperature Shutdown (red)
5. Low Oil Pressure Shutdown (red)
6. Pre-warning for High Coolant Temperature (yellow)
7. Pre-warning for Low Oil Pressure (yellow)
8. Low Coolant Temperature (yellow light-indicated inoperative coolant heater)
9. Switch Off (flashing red-indicated genset not in automatic start mode)
10. Low Fuel (yellow)
11. Two customer selected faults (red)

i) Additional meters and controls:

1. AC Volt meter
2. AC Amp meter (dual range indicates current each phase)
3. High/Low Meter Scale Indicator
4. Volt meter/Amp meter Phase Selector with an Off Position
5. Frequency Meter (pointer type)
6. Console mounted Rheostat for $\pm 5\%$ Voltage Adjustment

j) Housing shall enclose the electric generating set, yet provide ample airflow. Factory-installed enclosure shall be constructed of heavy gauge, reinforced sheet steel and attach to the generator set's standard mounting base and radiator cowling. Easy access to engine-generator shall be provided by removable panels on each side. Rear hinged door shall open to permit access to the instrument panel.

k) Enclosure shall be provided with one coat of factory-installed primer and two coats of baked-on enamel finish.

l) Exhaust mufflers shall be provided as recommended by the set manufacturer. Mufflers shall be of the residential type. Muffler shall be factory mounted to the protective housing.

m) The contractor shall provide an exhaust condensation trap with manual drain valve to trap and drain off exhaust condensation to prevent condensation from entering the engine.

- n) Provide a suitable rain cap at the stack outlet. Provide all necessary flanges and special fittings for proper installation.
- o) Contractor shall mount and install all exhaust components as required by manufacturer and as required to comply with applicable codes and regulations. All components shall be properly sized to assure proper operation without excessive backpressure. Make provisions as required for pipe expansion and contraction.
- p) If natural gas is not available and a turbo-charged diesel generator is used, the contractor shall provide all fuel system piping, which shall be black iron pipe and shall be sized per drawings or as required for proper fuel flow to engines. Contractor shall provide all supply, return, vent, and fill lines as shown on the drawings, along with all fittings. Provide connections for connecting fuel system to engines in compliance with applicable codes and regulations.
- q) Contractor shall provide skid mounted standard sized fuel storage tank, tank level gauges, valves, tank filler fittings, tank vent fittings, and necessary items as shown on drawings to comply with applicable codes and regulations. Tanks shall be new, unused, and shall not be galvanized.
- r) Tanks shall be installed beneath the generator sets and shall be constructed such that the new generator with weatherproof enclosure shall mount directly to the tank. Contractor shall furnish and install vibration isolators between generator & tank and tank & ground as recommended by the manufacturer. Tanks shall be painted with one coat primer and two coats of baked on enamel.
- s) Fuel storage tanks shall be provided with shut-off valves and a water separator.
- t) The complete installation shall be initially started and checked out for operational compliance by factory-trained representative of the engine-generator sets manufacturer. The engine lubrication, oil as recommended by the manufacturer for operation under environmental conditions specified, shall be provided by the engine-generator sets supplier.
- u) SCADA / Odor Control: Pump stations may be required to have a SCADA and/or Odor Control system. The Authority's Engineer will make this determination during the review of the plans.

Start Up

Upon completion of the field installation, a field test shall be performed utilizing water and a check made to determine that the pump performance conforms with the pump characteristics curve for as long as operating period as is deemed necessary by the engineer. Pump shall operate quietly, without vibrating, without motor overload and without overheating of bearings.

The Authority may determine additional pump station requirements from time to time.

26.16 Sanitary Sewer Testing

The pressure test may be either a low-pressure pneumatic test or a low-pressure hydrostatic infiltration/exfiltration test. The contractor shall be required to furnish all labor, weirs, pumps, valves, gauges, testing materials and equipment.

26.16.1 Low Pressure Hydrostatic Test

If the ground water level is at or above the top of the pipe, the contractor shall dewater the sewer and conduct a satisfactory test to measure infiltration for at least 24 hours. The rate of infiltration shall not exceed 50 gallons per inch of inside diameter per mile of pipe per 24 hours. If leakage exceeds the specified amount, the contractor shall make the necessary repairs or replacements required to permanently reduce the leakage to within the specified limit, and the test shall be repeated until the infiltration conforms to the requirements specified herein. The test shall be conducted from manhole to manhole.

In the event that the ground water level is lower than the top of the pipe, the contractor shall conduct an exfiltration test. The test shall be conducted from manhole to manhole. The pipe shall be filled and additional water introduced into the manhole to raise the level two (2) feet above the top of the pipe in the upstream manhole. The contractor shall furnish all water required for exfiltration tests. The quantity of water to maintain this level is to be measured. The test shall be maintained for a 48-hour period.

The rate of exfiltration shall not exceed 50 gallons per inch of inside diameter per mile of pipe per 24 hours. If leakage exceeds the specified amount, the contractor shall make the necessary repairs or replacements required to permanently reduce the leakage to within the specified limit and the test shall be repeated until the exfiltration conforms to the requirements specified herein.

26.16.2 Low Pressure Pneumatic Test

The test shall be performed from manhole to manhole and subsequent to completion of backfill but prior to replacement of pavements. The following procedure shall be implemented as a method of test:

Each length of pipe shall be cleaned by passing a snug fitting ball or mandrel through the pipe.

Plug all pipe outlets with suitable test plugs and brace all plugs securely to prevent blowout.

If the pipe to be tested is submerged in ground water, a test pressure probe shall be inserted by boring or jetting into the backfill to the level of the center of the pipe and the back pressure determined while passing air through the probe. The amount of back pressure thus determined shall be added to all gauge pressures required for testing the submerged line.

Add air slowly to the plugged pipe under test until the internal pressure is raised to 4.0 psi above back pressure.

Check exposed pipe and plugs for abnormal leakage, by coating with a soap solution or by means of an approved smoke device. If failures are observed, bleed off the air, make repairs and re-pressurize.

After an internal pressure of 4.0 psi above back pressure is obtained, allow at least 2 minutes for air temperature to stabilize, adding only the amount of air required to maintain 4.0 psi above back pressure.

After the two-minute period, disconnect the air supply by valve action.

When the pressure decreases to 3.5 psi above back pressure, start a stopwatch. Determine the time in seconds, for the interval during which the internal pressure drops to 2.5 psi above back pressure. The time interval shall not be less than the following tabulated values:

TIME IN MINUTES AND SECONDS

Test Length	100'	150'	200'	250'	26.140'	350'	400'	450'
Diameter								
8"	3-47	3-47	3-47	3-47	3-47	4-26	5-04	5-4
10"	4-43	4-43	4-43	4-57	5-56	6-55	7-54	8-54
12"	5-40	5-40	5-42	7-08	8-33	9-48	11-24	12-5
15"	7-05	7-05	8-45	11-08	13-21	15-35	17-48	20-0

If the observed interval is less than the required interval, the leaks shall be located repaired and the line retested.

26.16.3 Pressure and Leakage Testing

All force mains shall be pressure tested in accordance with the methods and requirements indicated below. Force mains of 4" or larger shall be tested at 150 psi, whereas smaller force mains shall be tested at 1.5 times the operating pressure.

All air shall be expelled from a pipeline before it is tested. All caps, plugs, and fittings shall be adequately braced and anchored to withstand the test pressures. The test pressure specified by the Authority shall be obtained, maintained and measured at the lowest elevation in the pipeline under test.

The hydrostatic test pressure shall be maintained in the pipeline for a minimum period of two (2) hours. At the end of the test period, if the test pressure has remained constant, the pipeline shall have passed the test. If the pressure has dropped, it shall be brought back to the test pressure by pumping a known volume of water (by pumping from a graduated container or by metering) back into the pipeline. The volume of water thus used, representing leakage from the pipeline, shall be recorded. If the leakage is less than the allowable leakage specified below, the pipeline shall have passed the test. If the leakage exceeds the allowable specified, the contractor shall locate the leaks, permanently repair the sections of piping where the leaks are occurring, to the

satisfaction of the Authority, and retest the pipeline as specified above. This process shall be repeated until the pipeline has successfully passed the pressure test.

Flanged, welded, threaded, and solvent welded pipelines shall show no leakage at the test pressure. The leakage for mechanical joint and push-on joint pipelines shall not exceed the allowable leakage per 1000 LF of pipe as shown in the following Table:

Allowable Leakage Per 1,000 L.F. at 150 psi							
Pipe Diameter:	4"	6"	8"	10"	12"	16"	20"
Gallons/Hour:	0.37	0.55	0.74	0.92	1.1	1.47	1.84

*Per AWWA C600-87 The leakage table is based on the formula of $L = S \cdot D \cdot P^{(1/2)} / (133,200)$.

Where L equals the allowable leakage in gallons per hour; S equals the length of pipe tested in feet; D equals the nominal diameter of the pipe in inches; and P equals the average test pressure maintained during the test in pounds per square inch.

26.16.4 Deflection Test for PVC Sewer Pipe

Upon completion of the pipe installation and backfill to grade, pipe shall be tested for diametric deflection. Maximum allowable deflection tests shall be performed by using a "mandrel".

Any pipe in which the deflection exceeds 5% of the internal diameter of the pipe shall be removed and replaced.

26.17 Sanitary Sewer Record Drawings

Record drawings shall at a minimum provide the following information:

- A. Title Block shall include:
 - a) "Record Drawing"
 - b) The name of the project.

- c) The Block(s) and Lot(s) of the project.
2. Main pipes shall indicate the sizes, length, slope, flow direction with arrows and material. Pipes shall be located where installed.
 3. Should a slope be below New Jersey Department of Environmental Protection minimum a calculation by the design professional engineer on velocity must be submitted.
 4. Main pipe inverts at manholes shall be NGVD 1929 elevations and the benchmark shall be shown.
 5. Manholes shall be located by stationing from the downstream manhole. Rim and invert elevations shall be shown.
 6. Service laterals shall indicate the sizes and material. Lateral pipes shall be shown where they connect to the main and the cleanout. Cleanouts shall be located by station/offset or triangulation. If possible the cleanout shall be triangulated to the corners of the house.
 7. Cleanouts shall be shown where required, between the curb and the sidewalk or back by the property line.
 8. The plans shall list the manufacturer names and model numbers of the material used for the main pipes, manholes, manhole covers, cleanout fittings and any other material used.
 9. Plan shall be signed and sealed by either a Professional Engineer or a Land Surveyor.
 10. All existing lines, lines by others, or future lines shall be shown with different symbols.
 11. An approval signature block shall be provided along with the contractor's name and dates of construction provided.
 12. Plan shall show all final tax map lot and block numbers of all developed and adjacent lots.
 13. Street names and right-of-way widths shall be shown.

14. North arrow and a legend of symbols shall be shown.
15. A Deed of Easement and Legal Description of all easements dedicated to the Authority shall be provided.
16. Sewerage pumping stations, lift stations, force mains, treatment plants, and sewerage collection system structures require all site location data, all equipment data, operation manuals, electrical wire diagrams, controls, heating, ventilating, air conditioning and plumbing data as installed.
17. Original submittal should be two sets of prints for review. Upon approval nine copies of prints, two reproducible mylars and an electronic version in AutoCAD or DFX format will be required.

27.0 WATER SYSTEM CONSTRUCTION AND DESIGN AND SPECIFICATIONS

27.1 General

The applicant shall comply with all of the Rules and Regulations as set forth herein. Failure to do so will result in a “stop work order” by the Authority. These Rules and Regulations are minimum requirements, and are not intended to replace detail specifications which are the responsibility of the applicant. They are intended to apply to usual and not exceptional conditions. These Rules and Regulations are subject to amendments by the Lacey Municipal Utilities Authority. The Authority reserves the right to specify additional requirements.

The following requirements are to be considered minimum requirements for the design and construction of water systems. The applicant shall, through the proper balance of supply, storage and distribution, secure for the community a water system having a minimum, “Class 6” rating as judged by the American Insurance Association and outlined in their Standard Schedule for Grading Cities and Towns.

System design and placement shall comply with the following construction specifications, incorporated herein by reference: all applicable NJ Department of Environmental Protection (NJ

DEP) rules, the American Water Works Association (AWWA) standards, and in the Pinelands Area, the Standards of the Pinelands Comprehensive Management Plan, and, in the coastal area, with NJDEP rules implementing the Coastal Area Facilities Review Act (N.J.S.A. 13:19-1 et seq.), with the strictest standards governing, with appropriate jurisdiction.

All standard specifications referred to herein, such as ASA, AWWA, ASTM, ANSI, and the like, shall be the latest revision thereof, at the time of Application for Final Approval.

All materials to be used on the proposed project that will become the property of the Authority upon conveyance by the applicant shall be manufactured in the United States, whenever available. The applicant is directed to refer to "Chapter 107, Laws 1982" of the State of New Jersey effective date October 3, 1982, as amended or supplemented.

Regardless of the size of the project, the water distribution system shall be capable of supplying the necessary domestic flow and fire protection based upon the complete project flow and fire requirements.

27.2 Estimation of Demand

The demand rates for all uses shall be considered in computing the total system demand. Where fire protection is provided in accordance with the Fire Suppression Rating Schedule, etc., as stated below, the system shall be capable of providing the required fire demand plus the required average daily residential demand as indicated in Table 5.1, NJAC 5:21-1.1 et seq, or the peak hour flows indicated in Table 5.2 NJAC 5:21-1.1 et seq, whichever is greater.

Average daily residential consumption shall be computed in accordance with the housing unit type and size data shown in Table 5.1, from NJAC 5:21-1.1 et seq. The peak daily flows shall be computed by applying a peaking factor of three (3) times the average daily residential consumption. The Authority may require deviations in the peaking factor value provided appropriate documentation and justification for the deviation from the standards is provided.

The design of the on-site water distribution system shall be adequate to provide fire protection as per ISO standard, Fire Suppression Rating Schedule, or per AWWA M26, "Manual of Water

Supply Practices - Distribution System Requirements for Fire Protection," ISO method on pages 3-9, incorporated herein by references.

27.3 Pipeline Design

Design capacity of water mains shall be such as to maintain a minimum pressure of 20 pounds per square inch (psi) at street level under all flow conditions.

Water mains shall be a minimum diameter of eight (8) inches except at the end of a permanent cul-de-sac, unless another size is required for fire flow and other criteria. A six (6) inch main may be used when it serves not more than 20 dwelling units and only one fire hydrant.

Distribution mains of the overall system shall be connected into loops so that the supply may be brought to the consumer from more than one direction. In balancing loops in a design, the Hardy-Cross, or an equivalent, method shall be used, Manning roughness coefficients listed in Table 7.1 in N.J.A.C. 5:21-7.1 or a C=100 frictional index based on the Hazen-Williams formula, may be used in these calculations. Dead-end lines shall be permitted within the design of a looped system provided that there are no more than 20 dwelling units permanently, or no more than 50 dwelling units temporarily, on a dead-end line. When dead-end lines are used, they shall be provided with a hydrant at the terminus as a means of flushing.

If the requirements for dead ends prevent the feasible development of the project, then the applicant shall demonstrate to the satisfaction of the Authority the site conditions that prevent the feasible development of the project and the proposed alternate design.

Unrestricted easements to the Authority water mains shall be a minimum of 20-feet wide. The pipe shall be placed 5 feet off either easement line to allow sufficient room for maintenance or installation of future pipe.

All dead-ends on mains to be extended in the future shall be valved, followed by one full length of pipe and closed with iron plugs or caps.

Valves, except on a permitted dead end, shall be located on distribution mains so that no more than one hydrant would be out of service as a result of a single water main break. A valve shall

be located in all small branches off larger mains, and where eight (8) inch or larger main lines intersect. At street intersections, valves shall be located near pipe intersections for ease in finding in the event of a water main break.

In addition to the above requirements, water mains shall be valved so that not more than one-quarter of a mile would be affected by a single water main break. Butterfly valves on 16-inch mains or larger shall be furnished.

Hydrants shall be spaced to provide necessary fire flow. The average building area served per hydrant shall not exceed 120,000 square feet. In addition, the distance between any dwelling and a hydrant shall not exceed 250 feet when measured along the street right-of-way. Commercial and industrial areas will require closer spacing.

No pipe shall be placed on private property unless the owner of the land is to own or operate the pipe, or an easement deeded to the municipality or utility authority is obtained. All easements shall be a minimum of 20-feet wide unless depth of pipe, soil conditions, or additional utilities require wider.

Service connections shall be installed along development off-site main lines to serve all individual properties along the route. The Applicant shall submit to the Authority the contractor's cost proposal for the installation of the off-site service connections for the Authority's review no later than thirty (26.14) days prior to commencement of construction. Upon agreement between the Authority and the Applicant, the costs for the installation of said service connections will be reimbursed by the Authority upon, written request by the Applicant, certification of the completion of the work by the Authority's Engineer and approved by the Authority.

27.4 Storage Tanks, Wells, Booster Pumping Stations and Treatment Plants

The plans for storage tanks, wells, booster pumping stations, and/or treatment plants, shall include general site plan showing boundaries, one-foot contours, proposed booster pumping stations, wells, underground piping and appurtenances, and underground and overhead wires. The detail plans for wells shall show the depth, size and construction of each well. Results from test well, logging, etc. shall be furnished as the basis for design. The ground strata through which the well is to be driven shall be shown in cross-section. The arrangement of mechanical

and electrical equipment within the well house plus connections to the storage tanks and distribution system shall be shown. The method and equipment proposed for applying sodium hypochlorite shall be clearly indicated. If treatment beyond chlorination is required, the plans shall show details of each component of the treatment facility, the method of applying chemicals, master meter, piping, valves, etc. The plans and specifications must indicate provisions for landscaping, paved roads, and walkways. Drawings shall conform to the size specified within these rules and regulations.

27.4.1 Site Lighting

Motion sensitive site lighting shall be provided. It shall be positioned to provide sufficient illumination for site security and to perform work on-site at night without additional lighting. The lights should not produce glare or unwanted illumination on the adjacent properties. There shall be an on/off switch for the light in a controlled area, and explosion proof lights shall be installed in all facilities. The Authority may require additional equipment for the purpose of for site security.

27.4.2 Site Fencing

The entire site of the facility shall be enclosed by a six-foot (6') fence. The fence shall be located approximately six feet from the property line, and located on property owned by the Lacey Municipal Utilities Authority. The fence shall be green vinyl coated chain link fence with barbwire and green vinyl coated poles. There shall be a swing gate for personnel and a double swing gate for the driveway.

27.5 Design of Wells

Wells shall be constructed and protected against possible contamination in accordance with American Water Works Association Standard A100. Well casings should be welded and made up with threaded couplings, and the protective casing shall have tight joints throughout its entire length.

A gamma ray log and/or a caliper log shall be provided for each well. The flow from each well shall be averaged over a 72-hour period and shall not be less than 26.140 gpm with a

drawdown not lower than 5 feet above the top of the screen or pump, whichever is higher. Static readings of the well shall be taken every 3 hours for 12 hours prior to starting the test. During the test, one hour will be permitted for adjustment of equipment during each 8-hour period except that the pumping shall be continuous during the final 8 hours.

Test water level readings shall be taken at the following time intervals:

6 readings every 5 minutes for 26.14 minutes

3 readings every 10 minutes for 26.14 minutes

4 readings every 15 minutes for 60 minutes

2 readings every 26.14 minutes for 60 minutes

1 reading every 60 minutes for remaining test time.

Area of influence of the well shall be determined by at least one observation well. Observation well requirements may be waived for wells over 200 feet in depth. Also, observation shall be made at all existing wells within a 1,000-foot radius regardless of well depth.

Well heads shall be at an elevation higher than the maximum flood level and high enough to permit drainage away from the facilities. All wells, treatment plants, and above ground appurtenances shall be located at least 500 feet from any possible source of contamination and shall be enclosed with a six (6) foot high chain link fence. They shall be provided with a double gate entrance for pedestrian and truck use.

The maximum pumping permitted from each well field shall be taken at 50% of the normal capacity of the well as determined from the aforementioned 72-hour test. Emergency electrical power must be provided.

27.6 Design of Treatment Plants

No general rules can be formulated for the design of treatment plants, and each case will be considered individually based upon the raw water quality. Treatment facilities shall be so designed to produce water that is reasonably uniform and of the quality required by the New Jersey Department of Environmental Protection.

Treatment plants involve a considerable amount of design criteria. If an applicant is required to construct a plant, it must be in conformity with all existing State and Federal regulations. All designs must be fully reviewed and approved by the Authority Engineer.

The type and method of treatment must be approved by the New Jersey Department of Environmental Protection. Treatment plant plans and specifications must include provisions for lawns, shrubbery, paved roads and sidewalks. Plants shall be architecturally compatible with the environment. The entire property must be surrounded by a 6 foot high chain link fence.

Separate gates must be provided for pedestrian and truck use. Detailed estimates of operating and maintenance costs of the proposed treatment plant must be submitted with the engineer's estimate. Emergency electrical power must be provided. All water shall be disinfected before it enters the distribution system and shall have a residual of 0.2 mg/1 throughout the system. All standards of U.S. Environmental Protection Agency applicable to protection of the water sources, wells, water mains, equipment, and treatment works shall be met in the design of treatment plants.

The finished water shall meet the potable water standards adopted by the New Jersey Department of Environmental Protection. Adequate light, ventilation, heat and potable water supply shall be provided at the plant. Complete repair and operating tools and accessories shall be provided with the treatment facilities and wells.

27.7 Design of Booster Pumping Stations and Storage Tanks

In general, the requirements of the Safe Drinking Water Act shall be used. Suitable controls and remote telemetering must be provided from the pumping station or storage tank to the Authority's center of operations. Telemetry must be via an automatic self-dialing telephone system such as a RACO VERBATIM or equal. Storage tanks must be steel and shall be constructed by firms competent in the field of tank erection.

Storage may consist of an elevated tank, standpipe or, where units do not exceed 50, hydro pneumatic tank. The details of all storage facilities shall include tank dimensions, minimum water level and overflow level, capacity, foundation, piping, valve pit dimensions, etc. Storage in elevated tanks or standpipes shall have a total effective capacity, when combined with

pumping capacity, at least equal to the fire demand flow plus the maximum day consumption, or meet the peak hour demand requirements, whichever is greater.

The effective amount of water in elevated storage shall be that amount of water which is 70 feet higher than the highest point in the area being served, with allowance made for building heights.

All elevated storage tanks are to be equipped with a level recording system that is connected via a telephone lease line to the chart recorder at the Water Treatment Plant. A low level and high level alarm is to be installed and also transmitted via lease line to the Water Treatment Plant.

The pumping equipment, when hydro-pneumatic tanks are used, shall be designed to facilitate its change over to the overall elevated storage system, as required by the Authority, without undue loss in pressure in any part of the system.

The capacity of hydro-pneumatic tanks shall be sufficient to provide the peak hourly rate of consumption in combination with the pumping facilities for a period of not less than 20 minutes. The effective capacity of the tank shall be taken at 25%. The following formula shall govern the size of hydro-pneumatic tanks:

Required Tank Capacity in Gallons = (Peak flow less well yield) X 20 X 4. Peak hourly flow rate and total allowable yield from wells shall be expressed in gallons per minute.

A double acting altitude control valve shall be used for water level control in elevated storage tanks and standpipes. A by-pass line and pit shall also be provided.

27.8 Oversizing

When plans for future development necessitates oversizing of the water supply system, the Authority may enter into an agreement with the applicant to address the fair share of the costs.

If the size of any water main, as shown by the application to be installed by the Applicant, is inconsistent with the projected requirements of the area to be serviced, the applicant shall install

mains, as required by the Authority. The Authority shall pay the applicant the differences in the material, labor and excavation costs as determined by the Authority or its Engineer.

If the Authority requires the installation of a booster pumping station of greater capacity than that capacity determined by the Authority as necessary to serve the applicant, the Authority shall pay said applicant the difference between the cost of the facilities necessary to serve the applicant and the facilities required by the Authority as determined by the Authority or its Engineer.

The Authority will not assess the increased cost, if any, of the Engineer's review and inspection fee when the increased cost of such review and inspection to provide facilities in excess of those necessary to serve the applicant results from an order of the Authority.

If the Authority requires a treatment plant and/or water storage tank of greater capacity than that capacity determined by the Authority as necessary to serve the applicant, the Authority shall pay said applicant the difference between the cost of the treatment plant and/or storage tank necessary to serve the applicant and the cost of the treatment plant and/or storage tank required by the Authority.

27.9 Application to the New Jersey Department of Environmental Protection

If applicable, the applicant shall, as a condition of tentative approval from the Authority, prepare and submit to the New Jersey Department of Environmental Protection all required plans and specifications, Engineer's Report and the New Jersey DEP form(s). The applicant shall prepare and submit the entire exhibit to the New Jersey Department of Environmental Protection in the name of the Authority.

27.10 Shop and Working Drawings

Prior to construction, the contractor shall submit for approval shop drawings or working drawings of all items for the water system improvements, especially concrete reinforcement materials fabricated for the project and materials for which drawings are specifically requested. Such drawings shall show the principal dimensions and construction details. When it is

customary to do so or when the dimensions are of particular importance, the drawing shall be certified by the manufacturer as correct for this project.

No material shall be purchased or fabricated for equipment until the Authority's Engineer has approved the shop or work drawings. No work shall be done upon any part of a structure where a shop drawing or work drawing is required until such approval has been given by the Authority's Engineer. Six (6) copies of shop drawings or working drawings shall be submitted to the Authority for review and approval.

The approval of shop drawings or working drawings will be general and shall not relieve the applicant from responsibility for details of design, dimensions, etc., necessary for proper fitting and construction work.

28.0 WATER SYSTEM TECHNICAL SPECIFICATIONS

28.1 General

The applicant shall design and construct a water distribution system including, but not limited to, water mains, valves, hydrants, and all accessories capable of supplying the necessary domestic flow plus fire protection flow to the proposed project.

The Authority may perform a distribution system analysis to check the adequacy of the distribution system. The approval will be based on the successful results of said analysis.

28.2 Excavations

Excavation shall not be carried below the required level. All excavations shall be kept free of water until the installation of the pipe has been completed and backfilling of the excavation is completed. Excess excavation below required level shall be backfilled with $\frac{3}{4}$ " crushed stone as directed by the Lacey Municipal Utilities Authority.

Unstable soil shall be removed and replaced with ¾" crushed stone, crushed slag, or suitable fill, which shall be thoroughly tamped. The Lacey Municipal Utilities Authority will determine what constitutes unstable soil and will specify the amount to be removed and replaced.

28.2.1 Trench Excavation

Width of the trench at the top of the pipe shall be 6" minimum, 8" maximum, on each side of the pipe coupling. The bottom of the trench shall be rounded so that an arc of the circumference equal to 0.5 of the outside diameter of the pipe rests on undisturbed soil. Coupling holes shall be excavated accurately to size by hand. If a trench box is used, the bottom edges of the box shall at no time be below the proposed invert elevation of the pipe.

28.2.2 Bracing and Shoring

The contractor shall do all bracing, sheeting, and shoring necessary to perform and protect all excavation as required for safety of the workers, public, existing utilities, structures, pavements, and public and private property. When the sheet piling is driven below the bottom of the pipe or the structure, the Authority Engineer may direct the contractor to leave the sheeting in place.

28.2.3 Maintenance of Traffic

All work shall be performed in a manner that will ensure the least obstruction to traffic. The contractor shall at all times conduct his operation with not only the motorists' safety in mind, but also of the pedestrians and his own employees.

The requirements of the Agency having jurisdiction over the road in which the contractor is working shall govern. Emergency vehicles shall be provided access at all times.

The contractor is responsible for submitting traffic control plans and acquiring all road opening, traffic detour, and road closing permits.

28.2.4 Backfilling

Backfilling shall be done with approved materials free from large clods or stones. Unsuitable materials shall be removed from the site. Backfill materials in trenches shall be placed evenly and carefully around and over pipe in 6" maximum layers. Each layer shall be thoroughly and carefully tamped until one foot of cover exists over pipe.

The remainder of backfill materials shall be placed in one-foot lifts maximum, moistened if necessary, and compacted in areas not to be paved (utility easements). No compacting shall be done when the material is too wet.

All forms, trash, and debris shall be removed and cleared away from excavation. Approved backfill material may be from excavation or borrow. It shall be free from rocks, lumber, debris and frozen material. Backfill materials shall be placed symmetrically on all sides in 8" maximum layers. Each layer shall be moistened and compacted with mechanical or hand tampers. In roadway or area to be paved, each layer shall be compacted to density equal to that of the adjacent original materials, so that pavement can be placed immediately. The minimum compaction shall be 95%.

The trenches shall be backfilled at the end of each work day, except when the conditions require them to be left open overnight. When the trenches are left open overnight, temporary fencing shall be built around them.

Even though testing may indicate that the required density has been attained, the contractor will be responsible for correcting any settlement or damage to the utilities.

The Authority may require the applicant to provide an opinion of a professional engineer regarding the suitability of the on-site material to be used as backfill, subject to review and approval of the Authority Engineer.

Where the on-site material is deemed suitable, the opinion shall specify the appropriate installation methods for the material. Where the on-site material is deemed not suitable, the opinion shall specify modification or replacement of the material and the appropriate installation methods for the specified material.

28.2.5 Cleanup and Restoration

All excess material, trash, wood forms, and other debris will be cleaned up and disposed of properly. All areas shall be restored to their original condition or as required by the Ocean County Soil Conservation District.

28.2.6 Pavement

Existing pavement shall be restored in accordance with the rules and regulations of the agency having jurisdiction over the roadway. Said agency will determine if the roadway has been restored adequately.

28.2.7 Dewatering

Dewatering shall be accomplished by methods which ensure that the groundwater will be drawn down to an elevation two (2) feet below the bottom of the bedding. Upon removal of well points, deep wells or other dewatering equipment, the contractor shall backfill, compact, and pave where required. Well point and deep well holes shall be compacted for the full depth to a density equal to in-situ soils.

Dewatering for the structures and pipelines shall commence when groundwater is first encountered and shall be continued as long as the trench is open.

28.2.8 Erosion Control

Erosion control measures taken at the site shall be in full conformance with and meet all requirements of the "Standards for Soil Erosion and Sediment Control – New Jersey State Soil Conservation Committee."

A compliance certificate from the Ocean County Soil Conservation District shall be submitted to the Authority.

28.3 Piping And Accessories

28.3.1 General

The minimum allowable pipe diameter shall be 6". Where directed by the Authority Engineer, sewer pipes shall be encased in concrete at the crossings. Water mains and services shall be constructed with a minimum of 4' earth cover. Pipe materials to be used in construction of water mains shall be cement-lined ductile iron, or polyvinyl chloride pipe. For bridge crossings, or other special aerial installations, pipe material shall be steel, or ductile iron pipe. For water main extensions within the right-of-way of an existing or proposed collector road, pipe material shall be ductile iron pipe.

Thrust rods or retainer glands shall be installed at all points where change in flow direction or thrust may occur.

28.3.2 Handling

Pipe, fittings and accessories shall be handled with care and shall not be dropped or bumped against pipe or appurtenances already on the ground or against any other object on the ground. The contractor's methods for installation and handling of pipe, fittings and accessories shall conform to the pipe manufacturer's recommendations and AWWA C-600 Standard.

28.3.3 Cleaning

The interior of all pipe, fittings and accessories shall be thoroughly cleaned of all foreign matter before being installed and shall be kept clean until the work has been accepted. All joint contact surfaces shall be kept clean until the jointing is completed.

Every precaution shall be taken to prevent foreign material from entering the pipe during installation.

Groundwater shall not be allowed to rise around the pipe until the trench is backfilled and the grading is completed. Dewatering operations must be continuous for as long as the trench is open.

Whenever pipe laying is stopped, the open end of the pipe shall be closed with a snug-fitting plug.

28.3.4 Bedding and Pipe Installation

Bedding material shall be broken stone, free from silt, clay or organic material, and shall conform to the requirements of the New Jersey State Department of Transportation Standards for No. 57 coarse aggregate.

Pipe shall be bedded true to line and grade, and no blocking shall be used to bring the pipe to grade. Class "C" bedding shall be used for all pipe unless otherwise specified or directed by the Lacey Municipal Utilities Authority as warranted by field conditions. Class C bedding shall be defined as that method of bedding water mains in approved granular material with a shaped bottom in undisturbed earth so as to fit the lower part of the pipe, for a width of at least 50% of the pipe diameter; and in which the remainder of the pipe is surrounded to a height of at least 0.5 feet above its top with approved granular materials, shovel placed and tamped to completely fill all spaces under and adjacent to the pipe; all under the direction and inspection of the Authority.

Where the water main is to be laid without a special foundation, the earth forming the bed shall be free of large stones. The pipe shall then be evenly bedded in the earth, great care being taken to remove only enough of the earth to leave a uniform bed for the entire length of the pipe, except the bell, under which a recess shall be excavated to a sufficient depth to relieve it of any load and to allow ample space for making the joint. In case the bed shaped in the bottom of the trench is too low, earth must be thrown into the bottom and thoroughly compacted and new bed shaped for the pipe. It is unacceptable to raise the grade of the pipe by ramming earth beneath it. When the pipe has been bedded satisfactorily and the joint made, the recess around the bell shall be refilled with soil and enough soil shall be refilled and tamped on each side of the pipe to hold it securely in place, care being taken not to disturb the position of the pipe during this process.

Concrete cradle, where required, shall be constructed as directed. The concrete for the full width of the foundation shall be deposited continuously to the height of the outside bottom of the

pipe. Before this concrete is set, the pipe shall be evenly bedded therein, so as to have a uniform support for its entire length and the remainder of the concrete shall be immediately deposited in such a manner as to avoid changing the position of the pipe.

Concrete cradle shall be allowed to cure sufficiently to prevent consolidation of backfill, and wet concrete cradle shall be allowed to cure 24 hours before vehicle loads can be applied to that area of the trench. Steel plates may be used to cover the trench to protect the cradle from vehicle loads if the 24-hour undisturbed cure period cannot be provided.

Where the water main is to be laid below groundwater level, it shall be laid on ¾" crushed stone bedding, and the stone shall be deposited for the full width of the trench, to the height of the bottom of the outer dimension of the pipe.

The pipe shall then be bedded on this material and the remainder of the stone deposited and carefully tamped so as to avoid disturbing the pipe but giving a uniform support to its entire length.

Chlorine tablets shall be placed in the pipe during installation in accordance with the section on disinfection.

28.3.5 Ductile Iron Pipe (DIP)

Ductile iron pipe shall be centrifugally cast in metal molds in accordance with ANSI/AWWA C151/A21.51 (push on pipe), and C115/A21.15 (flanged joints). Thickness shall be designed in accordance with ANSI/AWWA C150/A21.50 and shall be a minimum of Class 52. The weight and class shall be conspicuously indicated by the manufacturer on the outside of the pipe. It shall be cement-mortar lined in accordance with ANSI/AWWA C104/A21.4. Joints shall be gasketed push-on in conformance with ANSI/AWWA C111/A21.11. The exterior of the ductile iron pipe shall be covered with an asphaltic coating in accordance with ANSI/AWWA C151/A21.51. In aggressive soils, ductile iron pipe wrapped in polyethylene, in accordance with ANSI/AWWA C105/A21.5, shall be used. The Authority Engineer will make the determination.

28.3.6 Polyvinyl Chloride Pipe (PVC)

PVC pipe shall have a dimension ratio of fourteen (14) and shall conform to ANSI/AWWA C900 for pipe sizes four (4) inches to 12 inches. The pressure rating shall be 200 psi. The PVC Cell Classification is 12454B as defined under ASTM D1784. The joints shall be elastomeric-gasket couplings of a corresponding size in accordance with ASTM F477. Laboratory performance requirements, as specified in ASTM D2639, shall be met. All PVC mains shall be UL listed for water mains as well as being tested and certified to ANSI/NSF Standard 61. Solvent-cement couplings shall not be permitted.

28.3.7 Steel Pipe

Steel pipe shall conform to AWWA C202. Steel pipe under 12 inches in diameter shall be Schedule 40, 12 inches and over shall have a wall thickness of 0.375 inches. Steel pipe shall be cement mortar lined and coated in accordance with AWWA C104. Buried steel pipe shall be wrapped in accordance with AWWA C203, Section A-1.4. Exposed steel pipe shall be primed (2 mil dry) and then painted with a two-coat vinyl system (5 mil dry total).

28.3.8 Fittings

Where transitions to flanged fittings are made, adapters approved by the Authority shall be used. Compact Mechanical Joint Ductile Iron fittings shall comply with ANSI/AWWA C153/A21.53 and ANSI/AWWA C111/A21.11. Thickness shall be designed in accordance with ANSI/AWWA C150/A21.50 and shall be a minimum of Class 52. The fittings shall be cement-mortar lined and sealed coated in accordance with ANSI/AWWA C104/A21.4. Joints shall be mechanical joint in conformance with ANSI/AWWA C111/A21.11. The joints shall be restrained by "GripRing" as manufactured by Romac Industries, Inc. The gland shall be ductile iron per ASTM A536 Grade 65-45-12. The gasket shall be styrene butadiene rubber (SBR) per ASTM D2000 MBA 710, compounded for water and ANSI/AWWA C111/A21.11. The exterior of the ductile iron pipe shall be covered with an asphaltic coating in accordance with ANSI/AWWA C151/A21.51. In aggressive soils, ductile iron fittings wrapped in polyethylene, in accordance with ANSI/AWWA C105/A21.5, shall be used.

28.3.9 Tapping Sleeves

Tapping sleeve shall be bolted type of cast iron construction with molded rubber gaskets to provide a permanently tight, flexible, leak-proof joint. No caulked or poured joints will be permitted. Tapping sleeve shall be equipped with a test plug. Contractor shall furnish gate valve, which is part of this installation, conforming in every respect with section 10.4.2 of these specifications. Tapping sleeve shall be Mueller Model H-615. Stainless steel tapping sleeves manufactured by Ford as style "FAST" or Smith Blair Model No. 663 are also acceptable.

28.4 Fire Hydrants

At minimum, hydrants shall be spaced so that the traveled distance between hydrants does not exceed 500 linear feet. Fire hydrants shall comply with the latest edition of AWWA Standard C-502. Fire hydrants shall have a minimum 5-1/4" main valve opening, and shall be equipped with two 2-1/2" hose nozzles and one 4-1/2" steamer nozzle. All nozzles shall be National Standard thread. The operating and nozzle cap nuts shall be 1-1/2" pentagon, open left. Street main connections shall not be less than six (6) inches in diameter. Hydrants shall be furnished with a 6" gate valve. In the interest of standardization hydrants shall be Mueller Model A-423, or equal. All fire hydrants shall conform to NFPA Standard 291. All hose connections shall have National Standard Threads. All fire hydrants shall be painted red. All hydrants are to be properly secured with thrust blocking, rods and "Griprings" by Romac. The preferred method is to rod the six (6) inch hydrant valve to the main, thence rod the hydrant to the six (6) inch valve. A 24-inch by 24-inch square concrete shock slab, six inches thick shall be installed around the barrel of the hydrant. The top of the slab shall be eight inches below the proposed grade.

28.5 Valves

28.5.1 General

System valves shall be installed with a minimum of $n-1$ valves at each intersection, where "n" represents the number of nodes at said intersection. For every run of pipe without intersection, a valve shall be placed every 1,000 LF. Valves 12" in diameter and smaller shall be gate valves. Valves larger than 12" diameter shall be butterfly valves. Automatic air release valves shall be

installed at the high point in the mains. All valves shall be equipped with a valve box allowing access to the valve nut.

28.5.2 Gate Valves

Gate valves shall be iron body, non-rising bronze stem with either double disc gates or resilient seated wedge. All internal and external ferrous metal surfaces shall be fully epoxy coated. The epoxy coating shall comply with ANSI/AWWA C550 and ANSI/NSF 61. Valves shall be full size with a maximum working pressure of 250 psi and a maximum static pressure of 500 psi. Valves shall meet or exceed ANSI/AWWA C509 and ANSI/NSF 61. Valves shall open left (counter clockwise) and be provided with 2" square wrench nuts a maximum of 4' from grade. Gate valves shall be Mueller Model A-2360-20 or equal.

28.5.3 Butterfly Valves

Valves on 16-inch mains or larger shall be butterfly valves and shall have suitable by-passes. Body shall be ductile or cast iron. Disc shall be ductile iron with a resilient nitrile rubber seat. Discs shall be self-adjusting. Butterfly valves shall be clockwise closing. Butterfly valves shall comply with AWWA C-504 Standard. Butterfly valves shall be Mueller Model B-5226 or equal.

28.5.4 Automatic Air Release Valves

Automatic air release valves shall be float-actuated with heavy cast iron body, stainless steel float, and bronze or stainless steel working parts. Air release valves shall be fitted with blow-off valves, isolation valve, quick disconnect couplings and a minimum of 6' of hose for backflushing. Piping required to pipe air release valve discharge to nearest drain shall be installed. Air release valves shall be APCO Heavy Duty Air Release Valves No. 400 Series by the Valve & Primer Corporation.

28.5.5 Valve Boxes

All gate and butterfly valves shall be equipped with an adjustable valve box. Valve boxes shall be adjustable, two-piece cast iron slip type with a minimum shaft diameter of 5-1/4 inches, with drop cover indicator of "water" and direction of valve operation. The valve box shall be series

6855 as manufactured by Tyler Pipe. The valve box cover shall be set flush with the surface of the finished grade.

28.6 Tracer Tape

All nonmetallic pipe installed shall be traced with a metallic detectable tape bonded on both sides with plastic film. The tape shall be 3-inches wide with 1-1/2 inch lettering that states "Caution Water Pipe Below". The tape shall be anchored to all valve boxes, hydrants and services so that it is electronically continuous. Contractor must demonstrate tape is electronically continuous before final acceptance. The metallic tape shall be installed one foot above all PVC or other non-metallic water main.

28.7 Water Services

28.7.1 General

Water service laterals shall be installed to each individual lot at the time of main installation. Service lateral shall be installed from the main and terminate behind the curb with a curb valve. Contractor shall saw-cut the letter "W" on the top of curb in front of the curb box. Three-quarter to 2" service laterals shall be iron pipe size polyethylene or type "K" copper tubing per AWWA C800. For services larger than 2", Polyvinyl Chloride or Ductile Iron pipe shall be used. PVC pipe shall be in accordance with Section 29.6.6. DIP shall be in accordance with Section 29.6.5.

The water service connections for service to docks must include a curb shut off, a water meter with a remote readout and a backflow prevention device. The make and model of the backflow preventer shall be submitted to the Authority's Engineer for approval. The water meter and backflow preventer shall be installed in a location to the satisfaction of the Authority and visible for inspections by the Authority's personnel. The property owner shall be responsible to construct, own, operate and maintain the dock service, and the Authority shall bill the property owner for the water usage to the dock area based on the current rate schedule.

28.7.2 Polyethylene Tubing

Polyethylene service shall be minimum $\frac{3}{4}$ " inside diameter, iron pipe size, with a dimension ratio (DR) of nine (9) and a working pressure rating of 200 psi. Polyethylene compounds utilized shall have a grade of PE34 with a minimum cell classification of PE 345444 for PE3408 materials, as defined in ASTM D3350. The tubing shall comply with all requirements of AWWA C901 and ANSI/NSF Standard 61.

28.7.3 Copper Pipe

Copper service line shall be minimum $\frac{3}{4}$ " inside diameter, type K in conformance with ASTM B88.

28.7.4 Corporation Valve

For polyethylene services equal to 2" or smaller the corporation valve shall be manufactured in accordance with ANSI/AWWA C800-01 Standard and ASTM B-62 and have a working pressure of 26.140 psi. Corporation shall be ball valve, quarter-turn check type. Corporation valve shall be A.Y. McDonald model 4701B-33 or equal.

For all type "K" copper services, the corporation valve shall be manufactured in accordance with ANSI/AWWA C800-01 Standard and ASTM B-62. Corporation valve shall be ball valve, quarter-turn check type. Corporation valve shall be A.Y. McDonald model 4701B-22 or equal.

28.7.5 Curb Valve

All curb stops shall be constructed in the public right-of-way and not in any driveway or sidewalk.

For all polyethylene services all curb valves shall be manufactured in accordance with ANSI/AWWA C800-01 Standard and ASTM B-62. Curb valve shall be ball valve, quarter-turn check type. Curb valve shall be A.Y. McDonald model 6100-33, or equal.

For all type "K" services all curb valves shall be manufactured in accordance with ANSI/AWWA C800-01 Standard and ASTM B-62. Curb valve shall be ball valve, quarter-turn check type. Curb valve shall be A.Y. McDonald model 6100-22, or equal.

28.7.6 Curb Box

Curb box shall be constructed of cast iron and be furnished complete with cast iron lid and shut-off rod. Curb box shall be A.Y. McDonald model 5601 with model 5601L lid, or equal for services of 1" or smaller. For services larger than 1", but equal to or less than 2" the curb box shall be A.Y. McDonald model 5603 with model 5601L lid or equal.

28.7.7 Saddle

Saddle shall be epoxy coated ductile iron, double strap stainless steel saddle. Saddle shall be Smith Blair model 267, or equal. Saddles shall be used for all type 'k' copper services and polyethylene services tapping a polyvinyl chloride main. Saddles shall also be used for 2" services tapping a ductile iron main. Services smaller than 2" tapping a ductile iron main may be direct tapped.

28.7.8 Meter

The meter shall be provided and installed by the Authority at the applicant's cost, which shall be established by the Authority. Upon completion of the cable installation by the applicant, the Authority shall install the remote readout receptacle and set the account codes. The remote readout receptacle shall be installed on the outside of an exterior wall no more than eighteen (18) inches from either side of the electric meter and approximately four to five feet above the finished grade. There shall be no shrubs, fences or obstructions whatsoever which prevent easy access to the receptacle. The water service shall not be used until the installation of the meter and all accessories has been completed and the Authority has determined the system is operating properly.

No meters are to be installed in a crawlspace on new construction. On existing homes, the meter shall be within 10 feet or less from a crawlspace entry.

Where the construction of more than one unit is contemplated, the meter location shall be standardized by the applicant.

Meter shall be a displacement type magnetic drive cold water meter. The meter shall comply with ANSI/AWWA Standard C700. For services of 1" and smaller the meter shall be model SR11 as manufactured by Sensus, or equal. For services of 1 1/2" and 2" the meter shall be model SR as manufactured by Sensus, or equal. All meters shall be equipped with a radio read meter transceiver unit (MXU). The MXU shall be Sensus Model 505, or equal.

28.7.9 Fire Services

The pipe size shall be of an adequate size to provide sufficient water to the applicant's fire suppression system. The fire service size shall be determined by the applicant's engineer. All fire services shall be D.I.P. Class 52 conforming to Section 29.6.5 Ductile Iron Pipe and Section 29.6.8 Fittings of this specification. Every fire service shall include a detector check valve.

28.8 Disinfection And Testing

28.8.1 General

Prior to placing water mains and appurtenances into service, said mains and appurtenances shall be pressure and leakage tested and disinfected in accordance with the provisions of this Section.

The contractor shall provide all labor, materials, equipment, gauges, air, water, and all else necessary to test and disinfect all piping systems and appurtenances installed.

28.8.2 Pressure and Leakage Testing

All air shall be expelled from a pipeline before it is tested. All caps, plugs, and fittings shall be adequately braced and anchored to withstand the test pressures. The test pressure specified by the Authority shall be obtained, maintained and measured at the highest elevation in the pipeline under test.

A hydrostatic test pressure of 150 psi shall be maintained in the pipeline for a minimum period of two (2) hours. At the end of the test period, if the test pressure has remained constant, the pipeline shall have passed the test. If the pressure has dropped, it shall be brought back to the test pressure by pumping a known volume of water (by pumping from a graduated container or by metering) back into the pipeline. The volume of water thus used, representing leakage from the pipeline, shall be recorded. If the leakage is less than the allowable leakage specified below, the pipeline shall have passed the test. If the leakage exceeds the allowable specified, the contractor shall locate the leaks, permanently repair the sections of piping where the leaks are occurring, to the satisfaction of the Authority, and retest the pipeline as specified above. This process shall be repeated until the pipeline has successfully passed the pressure test.

Flanged, welded, threaded, and solvent welded pipelines shall show no leakage at the test pressure. The leakage for mechanical joint and push-on joint pipelines shall not exceed the allowable leakage per 1000 LF of pipe as shown in the following Table:

Allowable Leakage Per 1000 L.F. at 150 psi

Pipe Diameter;	4"	6"	8"	10"	12"	16"	20"
Gallons/Hour:	0.37	0.55	.075	.092	1.1	1.47	1.84

*Per AWWA C600-87

The above table is based on the formula of $L = (S \cdot D \cdot P^{1/2}) / (133,200)$.

Where L equals the allowable leakage in gallons per hour; S equals the length of pipe tested in feet; D equals the nominal diameter of the pipe in inches; and P equals the average test pressure maintained during the test in pounds per square inch.

28.8.3 Disinfection

Pipes and hydrant barrels shall be disinfected by introducing either a chlorine gas water mixture by means of a solution fed chlorinating device or by fastening chlorine tablets to the inside of each pipe. The following table indicates the required number of tablets to be fastened per twenty-foot (20') length of pipe.

Size of main:	6"	8"	10"	12"	16"	20"	24"	26.14"	36"
Number of Tablets:	6	8	12	14	16	18	20	35	40

The dosage shall be of such a strength as to produce in the filled line a solution of not less than 50 parts per million of free chlorine. The solution shall remain in the lines for a period of no less than 12 hours. During this 12-hour period, all valves in the system shall be operated to disinfect all parts of said valves. A water sample will be taken and a bacteriological analysis will be performed. The developer will perform said sampling and analysis. Should the bacteriological test fail, the contractor, at his expense, shall be responsible for rechlorinating and flushing the main as many additional times as may be necessary to make the main free of bacteria.

28.8.4 Flushing

After disinfection and testing, the main shall be thoroughly flushed. The Authority must be notified three business in advance of any flushing. A representative of the Authority will be present during any flushing of the mains. Only authorized personnel shall operate existing valves.

28.9 Water System Record Drawings

Record drawings shall at a minimum provide the following information:

1. Title Block shall include:
 - a. "Record Drawing"
 - b. The name of the project.

- c. The Block(s) and Lot(s) of the project.
2. Main pipes shall indicate the sizes and material. Pipes shall be located by offset measurements where installed, at maximum 500 foot intervals, usually at every manhole, if sewer is installed.
3. Valves shall be shown in line and triangulated.
4. Service lines shall indicate the sizes and material. Curb stops shall be triangulated or stationed/offset from the nearest downstream sewer manhole. If possible the curb box shall be triangulated to the corners of the house.
5. Curb boxes should be shown where required, between the curb and the sidewalk or back by the property line.
6. Bends shown shall have the degree of curvature noted. Bends shall be triangulated or stationed/offset from the nearest downstream sewer manhole.
7. Hydrants shall be located by station/offset, from the nearest downstream sewer manhole.
8. The distance between the hydrant and the hydrant valve shall be shown.
9. The plans shall list the manufacturer names and model numbers of the material used for the main pipes, hydrants, valves, valve box, service tubing, curb box, corporation, curb box and any other material used.
10. Plan shall be signed and sealed by either a Professional Engineer or a Land Surveyor.
11. All existing lines, lines by others, or future lines shall be shown with different symbols.
12. An approval signature block shall be provided along with the contractor's name and dates of construction provided.
13. Plan shall show all final tax map lot and block numbers of all developed and adjacent lots.
14. Street names and right-of-way widths shall be shown.
15. North arrow and a legend of symbols shall be shown.

16. A Deed of Easement and Legal Description of all easements dedicated to the Authority shall be provided.
17. Water storage tanks, wells, well houses, booster pump stations, water treatment plants require all site location data, all equipment data, operation manuals, electrical wire diagrams, controls, heating, ventilating, air conditioning and plumbing data as installed.
18. Original submittal should be two sets of prints for review. Upon approval nine copies of prints, two reproducible mylars and an electronic version in AutoCAD or DFX format will be required.

29.0 EXHIBITS

- A. Application for Review of Plans
- B. Water System Development Cost Estimating Schedule
- C. Sanitary Sewer System Development Cost Estimating Schedule
- D. Performance Bond
- E. Maintenance Bond
- F. Performance Standby Letter of Credit
- G. Maintenance Standby Letter of Credit
- H. Development Application, Review and Inspection Fees
- I. Schedule of Rates and Fees
- J. Water System Record Drawing Requirements
- K. Sanitary Sewer System Record Drawing Requirements
- L. Submittal Requirements Check List
- M. Close-Out Documents
 - a) Deed of Easement and Right of Way (Corporations)
 - b) Deed of Easement and Right of Way (Individual or Partnership)
 - c) Application for Certification of Completion
 - d) Bill of Sale
 - e) Contractors Affidavit
 - f) Affidavit of Title (Individual or Partnership)
 - g) Affidavit of Title (Corporation)
 - h) Resolution of Sale (Corporation Only)

30.0 DETAILS

- a) Typical Street Intersection
- b) PVC Sewer Pipe Bedding
- c) Auxiliary Water Meter Installation
- d) Water Meter Installation
- e) Carrier Casing Pipe Concrete Cradle
- f) Concrete Cradle (Water)
- g) Corporation Stop
- h) Water Service Connection
- i) Fire Hydrant Piping Plan View
- j) Fire Hydrant Profile
- k) Gate Valve
- l) Utility Crossing (Water)
- m) Water Trench
- n) Wet Tap Connection
- o) Thrust Block
- p) Deep House Connection
- q) External Drop Connection
- r) Internal Drop Connection
- s) Typical Manhole
- t) Doghouse Manhole
- u) Aluminum Manhole Step
- v) Copolymer Polypropylene Plastic Manhole Step
- w) Manhole Chute
- x) Manhole Frame and Cover
- y) Manhole Wall with Stub and House Connection
- z) Manhole with Branch Connection
- aa) Structure Backfill and Concrete Encasement
- bb) Typical House Sewer Connection