

Ewing – Lawrence Sewerage Authority

Lawrence Township, New Jersey
www.elsanj.org



Construction Rules and Regulations Application, Design Instructions and Standard Details

October 2015

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Construction Rules and Regulations

Application, Design Instructions
and Standard Details

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Ewing – Lawrence Sewerage Authority

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A. DEFINITIONS

As used in these Rules and Regulations, unless a different meaning clearly appears from the context, the following words shall have the following meaning:

“Applicant” means property owner, or property owners, 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 for sewerage and/or connection to the Authority’s sewerage;

“As-Built Drawings” means drawings prepared and submitted to the Authority which reflect all changes resulting from field adjustments, change orders and contract modifications and shall indicate all locations, dimensions, and elevations of the installed system as recorded by the contractor and Applicant’s Engineer.

“Authority” means the Ewing-Lawrence Sewerage Authority, its duly authorized representatives, its engineers and inspectors, for whom the work hereinafter described is to be performed;

“CAD” means the latest version of AutoCad;

“ELSA Service Area” means that area indicated on the current Wastewater Management Plan;

“Fee Schedule” means the resolutions prescribing charges, rules and regulations relating to connections and uses of services of the sewerage of the Ewing-Lawrence Sewerage Authority;

“NJDEP” means the New Jersey Department of Environmental Protection;

“Owner” means the person, firm or entity which is the record owner of any property as shown on the tax records of the Township;

“Rules and Regulations” means the Ewing-Lawrence Sewerage Authority Construction Rules and Regulations and the Rules and Regulations Governing all Discharges to the Wastewater Treatment Works of the Ewing-Lawrence Sewerage Authority;

“Sample” means physical examples furnished by the Applicant to illustrate materials, equipment or workmanship, and to establish standards by which the work will be judged;

“Service Connection” means the wyes, pipes and cleanouts required to provide sewer service to a single structure;

“Sewer System” means the manholes, pipes, laterals and appurtenant items required to provide sewer service to multiple structures;

“Shop Drawing” means any drawings, diagrams, illustrations, schedules, performance charts, brochures or other data which are prepared by the Applicant which illustrates some portion of the Work;

“User” means any person, firm or entity which discharges any waste or substance of any composition or

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nature which is then transmitted through the sewerage of the Authority; and

“Work” means all labor necessary to produce the construction required by the specifications and contract drawings, and all materials and equipment incorporated or to be incorporated in such construction.

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B. CONDITIONS REQUIRING A PERMIT/APPROVAL

1. Service Connections

Single family dwellings, two-family dwellings and individual non-residential buildings with anticipated flow less than 750 gallons per day of sewage or waste will be required to install a service connection to the nearest existing ELSA sanitary sewer via an approved building sewer of adequate capacity, unless otherwise approved by the Authority.

2. Sewer Systems

Residential subdivisions containing two or more building sites or any residential structure to be used by three or more families, regardless of volume of flow, and all non-residential development such as schools, commercial buildings, industrial buildings and all other structures where the Authority estimates an average daily discharge or more than 750 gallons per day of sewage or waste, will be required to install a sanitary sewer of adequate capacity in the Authority service area.

Any modifications (except service connections) to the existing Authority system, regardless of flow, will be considered to be an installation of a sanitary sewer system.

3. Changes in Flow Quantity or Quality

Any changes in use of any existing property or facility shall be subject to review and re-evaluation of the sewer connection service and the number of EDU's assigned by the Authority. Any increase in the number of EDU's shall subject the Applicant to additional connection fees.

4. Additions or Expansions

Any physical additions to or expansions of existing property or facility shall be subject to review and re-evaluation of the sewer connection service and the number of EDU's assigned by the Authority. Any increase in the number of EDU's shall subject the Applicant to additional connection fees.

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C. APPLICATIONS TO THE AUTHORITY

An applicant will not be given consideration by the Authority unless an application, together with the required fees, and supporting data, has been filed with the Executive Director. The application must be signed by the Owner, or Owners, or by a proper official of the company, or if signed by an authorized agent, shall be accompanied by an authorization certified by the Secretary of the applicant's organization.

In the event the applicant is permitted to tie into an existing sewer, trunk sewer, pumping station, or treatment plant of adequate capacity, he shall be prepared to pay the connection and capacity fees per unit in effect at the time of connection.

The Authority Engineer, in conjunction with the Rules and Regulations, will govern the approximate sizes and location of sewers as well as places of discharge. If an opinion was made by the Authority during the preliminary review phase concerning the inability of the downstream system to accommodate the proposed flows, the Authority Engineer shall conduct an analysis of the system impacted by the proposed flows to determine the appropriate measures required to be provided by the applicant to adequately handle the proposed flow. The final application shall include sufficient engineering data to support acceptance of the proposed flow.

If the size of any sewer main, as shown by the Applicant's Engineer, is inadequate for the future requirements of the tributary area as indicated on the Master Plan or as determined by the Authority, the applicant shall install a larger size pipe, if required to do so by the Authority.

Approved applications will be null and void after the period indicated below from the date of approval, if no subsequent application is submitted.

Preliminary Approval - 180 days;

Final Approval - The minimum of 2 years or 1 year from NJDEP approval;

Final Approval Time Extension - 1 year each.

The Applicant is required to apply for final approval time extensions each and every year and will be subject to the Rules and Regulation which are in place at the time of the extension approval. Construction of the approved systems must be completed within three (3) years of the NJDEP approval.

All fees paid on approved applications that become null and void are non-refundable except for unearned review and inspection fees paid prior to construction, which are payable upon formal request by the Applicant. An applicant can, when fees are due, request an extension for an approval prior to its expiration upon filing of the appropriate form and required fee.

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D. DETAILED INSTRUCTION FOR FILING APPLICATIONS

1. General

All applications must be submitted at least sixty (60) days before a regularly scheduled meeting of the Authority. In addition to the Authority Engineers' review, the Authority staff and/or its Executive Director shall review the applications and supporting documents prior to the Meeting. All deficiencies or corrections to the documents are required to be made by the Applicant as a result of the Authority's review and the Authority Engineer's review shall be made by the Applicant and shall be reflected in subsequent submittals. All applications are to be signed by the Owner or Owners, or by an authorized agent of the Owner and shall be accompanied by a certified copy of the preliminary approval from the local Planning Board or Zoning Board, as applicable.

2. Instructions for Application for Service Connections

Owners of property or developers desirous of making connection to existing sewers with a service connection or connections shall file an Application for a Service Connection with the Executive Director of the Authority. The application shall be accompanied by the appropriate fee as prescribed in the Authority's Fee Schedule and shall be based upon the EDU Determination Table.

3. Instructions for Application for Change in Quantity or Quality

Owners of property or developers desirous of changing the use of an existing facility which will increase the flow to an existing sewer, shall file an Application for a Service Connection with the Executive Director of the Authority. The application shall be accompanied by the appropriate fees as prescribed in the Authority's Fee Schedule and shall be based upon the EDU Determination Table.

4. Instructions for Application for Sewer Systems

Owners of property or developers desirous of installing sewer systems which will make connections to existing sewers shall file an application for Preliminary and Final Approval with the Executive Director of the Authority. Preliminary Approval constitutes the Authority's approval of the concept of the proposed sanitary sewer system. Final Approval constitutes the Authority's approval of the technical and detailed design of the proposed sanitary sewer system.

5. Calculation of Equivalent Dwelling Units (EDU)

The applicant shall calculate the number of EDUs in accordance with the Ewing Lawrence Sewerage Authority EDU Determination Table contained in Section N. In cases where the EDU Determination Table does not contain a category for the proposed use, the Authority will determine the number of EDUs based on the estimated sewerage flow divided by 300 gallons per day. In determining EDU's partial EDU's shall be rounded up to the next highest whole number.

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6. EDU Credits

An EDU credit for existing use may be applied to the new project. EDU credits will only be applied if payments for sewer service are current.

The EDU credits shall be applied as follows:

- a. The EDU Credit shall be based on the existing use using the EDU Determination Table.
- b. If it is not possible to utilize the EDU Determination Table, the credit shall be based on average water use for the past five years at a rate of 300 g.p.d. per EDU rounded to the next lowest whole number. No credit shall be given if the existing facility has been demolished prior to the last 12 months or has had no water use for the last 12 months.
- c. The credit shall not exceed the number of new EDUs.

7. Public and Non-profit Housing

The EDU Connection Fee shall be reduced 50% for new connections to the sewer system for public housing authorities and non-profit organizations building affordable housing projects as well as any 501(c)(3) entity building housing accommodations satisfying a generally accepted societal need.

8. Preliminary Review

The Applicant shall submit two (2) sets of the application forms, four (4) copies of a general location plan indicating existing and proposed facilities as well as a sketch plan showing streets and lots with tax lot and block numbers, four (4) copies of the sewer system plans, and two (2) copies of the engineer's report fully describing the proposed sewerage facilities.

An application fee as prescribed in the Authority's Fee Schedule shall accompany the application and shall be based upon the EDU Determination Table. An initial review fee shall also be submitted along with the application. In the case of a sewer system for a subdivision, the fee shall be based on the number of lots as prescribed in the Sewer System Fee Schedule for Subdivisions; in the case of a site plan, the fee shall be based on the building square footage as prescribed in the Sewer System Fee Schedule for Site Plans.

9. Final Review

The Applicant shall submit two (2) sets of the application forms, four (4) copies of a general location plan indicating existing and proposed facilities as well as a sketch plan showing streets and lots with tax lot and block numbers, four (4) copies of the sewer system plans, and two (2) copies of the engineer's report fully describing the proposed sewerage facilities.

An application fee as prescribed in the Authority's Fee Schedule shall accompany the application and shall be based upon the EDU Determination Table. An initial review fee shall also be submitted along with the application. In the case of a sewer system for a subdivision, the fee shall be based on the number of lots as prescribed in the Sewer System Fee Schedule for Subdivisions; in the case of a site plan, the fee shall be based on the building square footage as prescribed in the Sewer System Fee Schedule for Site Plans.

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10. Performance Guarantees

Upon final approval, but prior to on-site construction, the Applicant shall submit Performance Guarantees in the form of Bonds and Cash. The Performance Guarantees shall be in the amount of 120% of the approved Construction Cost Estimate. One hundred and ten percent (110%) may be in the form of an acceptable bond and the remainder in cash.

11. Maintenance Guarantee

Upon completion of construction and final inspection of the Sewer System or portion thereof, the Developer may request a reduction or release of his Performance Guarantees.

Release or reduction of the Applicant's Performance Guarantees shall be by resolution of the Authority. Upon approval by the Authority of said Performance Guarantee reduction or release the Applicant shall post a Maintenance Guarantee in the form of Cash or Bond with the Authority in the amount of 15 % of the as-built Construction Cost as determined by the Authority's Engineer. Said Maintenance Guarantee shall remain in effect for two years.

12. Phasing

If the Applicant proposes to construct the development in phases, the final application shall clearly indicate the phases and the portion of the system proposed for the initial phase of construction. As subsequent phases are proposed for construction, the Applicant shall submit additional escrow, performance guarantees and supporting documents for each phase. All final applications within the phasing method shall contain an overall sanitary sewer plan indicating the sections included within the phase for which final approval is being requested together with a list of the number of units, lots or building square footage proposed for each phase, as applicable.

13. Design Engineer's Report

The design Engineer's Report shall be signed and sealed by a New Jersey Licensed Professional Engineer and shall contain the following information:

- **General Map of the development** showing block and lot numbers for each of the lots on the subdivision. The final subdivision map shall show all easements and lands to be dedicated to the Authority.
- **Plans and Profiles** of all proposed sewers (signed and sealed).
- **Specifications** for the construction of proposed sewage system and appurtenances (signed and sealed).
- **Detailed Plans and Specifications** for sewage pumping stations and treatment plants (signed and sealed), as applicable.

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- **Agent Authorization** if application is signed by someone other than the Owner, must include the Owners consent letter signed by the Owner. (two copies).
- **Design Engineer's Detailed Cost Estimate** of sanitary sewerage construction.
- **Construction Details** of all appropriate appurtenances from the Authority's Standard Details and of siphons, connections and other sewer appurtenances not indicated by the Authority's Standard Construction Details.
- **Application Form and Attachments** should be duplicated and filled out in the name of the Authority to the New Jersey State Department of Environmental Protection, with applicable fees.
- **Design Engineer's Report** setting forth the basis of design shall be submitted to the authority for each project. The Engineer for the Applicant shall state that the plans, specifications and engineer's report are in accordance with the Rules and Regulations of this Authority and the NJDEP. If it is found that the plans, specifications or engineer's reports are not in accordance with the Rules and Regulations of the Authority as well as the NJDEP, the authority will defer action on the project until revised information is submitted.
- **General Subdivision Map.** A map of the overall subdivision showing lot lines, Lots, Blocks designations shall be submitted on 11"x17" sheet.
- **General Map** of the development must show Block and Lot numbers for each of the Lots on the subdivision. Draft easement maps and descriptions for all off-site sewers must be submitted along with the general map of the entire project. The applicant must certify that easements from others have been acquired and submit a copy of the final subdivision map.
- **Plans and Profiles of all Proposed Sewers** shall be submitted for the sewage system and they must be properly entitled. The plans shall be of uniform size (24" x 36"), with a ½ " border on top, bottom and right side, and a 2" border on the left side. The plans shall show the following:

a. Details

The plans shall show existing and proposed contours, all existing and proposed streets and surface elevations at all breaks in grade and street intersections, tributary areas with anticipated population per acre, wetland limits, the true or magnetic meridian, boundary line, title, date and scale, 1" = 50'. The contour interval shall not exceed two feet. The plans shall clearly show the horizontal alignment of the proposed system. All manholes shall be named and labeled. All laterals and service connections shall be shown. Any area from which sewage is to be pumped shall be indicated clearly. All sheets shall be numbered consecutively. Drawings not meeting reasonable engineering standards as to accuracy, correctness and neatness will not be acceptable.

b. Symbols and Features

Proposed and existing gravity sewers and force mains shall be shown by solid and dashed lines, respectively.

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All topographical symbols and conventions of the United States Geological Survey shall be used.

c. Elevations

Permanent benchmarks of United States Geological Survey (USGS), the New Jersey Coast and Geodetic Survey (NJC&GS) shall be shown at least one per plan. Sewer inverts must be shown at each manhole, utility crossing and stream crossing. The elevations of surface features shall be shown to the nearest 0.1 foot and the sewer inverts to the nearest 0.01 foot.

d. Distance, Grades and Sizes

The distances and stationing between manholes, grades, sewer sizes, strength class and material shall be shown on the plans. Arrows must indicate the direction of flow. All laterals shall be shown on the plans.

e. Profiles

Profiles shall show all manholes, drop manholes, house connections, deep house connections, siphons, force mains, utility crossings, pump station and stream crossings. Gradient and sizes of sewers, spacing, stationing, surface elevations and sewer inverts shall be shown at each manhole. The location, stationing and invert elevation of each lateral and chimney shall be shown.

They shall be drawn to a standard scale (1"=50' horizontal and 1"= 5' vertical), and the scales shall be shown on each sheet. An index of the streets shall also be shown on each sheet.

In addition, the proposed elevations of all crossings of sanitary sewers with any other subsurface utilities shall be shown and reference to the NJDEP regulation concerning these crossings shall be noted on the drawing. A table of crossings indicating the crossing designation (number), invert, size and wall thickness of each pipe, vertical physical clearance and encasement type shall be provided on each sheet.

f. Easements

Easements in a form approved by the Authority Engineer and Attorney and executed by the property owner and/or other parties in interest will be required for all sanitary sewer lines (excluding service connections or building sewer) which are not within a public right-of-way. Easements shall be twenty feet wide for sanitary sewers up to fifteen feet deep. Easements shall be thirty feet wide for sanitary sewers over fifteen deep. The depth of sewer shall be measured from the design invert of the pipe to the surface of the proposed final grade. In unpaved or underdeveloped areas, the applicant shall provide a suitable twelve foot wide gravel service road within the easement to permit adequate access for maintenance of the system.

g. Specifications

Construction specifications shall be submitted for review by the Authority for conformance with these Rules and Regulations and shall be construed for use as construction specifications. The design engineer shall prepare, sign and seal specifications tailored specifically for the development and suitable for submittal to the NJDEP and, subsequently, the use of the Contractor.

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h. Detailed Plans for Pump Stations and Treatment Plants

The plans and specifications for pumping stations and treatment plants shall include a general site plan showing boundaries, streams, contours, floodplains and wetlands; proposed mechanical and piping arrangements; flow diagram with capacities; electrical layouts; underground piping; underground or overhead wires; water supply; landscaping; paving; and, other details necessary for review.

i. Agent Authorization

If an application is signed by someone other than the owner of the property cited in the application, a letter from the Owner is required indicating authorization of an agent. This letter shall be signed by the Owner and certified by an official notary showing certification number and expiration date.

j. Design Engineer's Estimated Costs of Construction

An itemized estimate of the entire sewage system shall be submitted for review by the Authority. This estimate shall include a description of the item, estimated quantity, unit price and extended price. Unit prices shall reflect the actual estimated cost of the item of work plus escalation projected to the estimated completion of construction. In addition, the estimate shall list the cost of the Design Engineer's shop drawing review, as well as preparation of as-built and easement drawings.

k. Construction Details

The sanitary sewer Standard Construction Details developed by the Authority must be utilized in the drawings. In addition, any additional design details not covered by Authority's Standard Construction Details must be included on the drawings.

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E. INFORMATION ON DESIGN OF SEWER SYSTEM

All materials to be used on the proposed projects that will become the property of the Authority upon conveyance by the Applicant shall be manufactured in the United States whenever applicable.

1. General Design

All sanitary sewers shall be designed to carry four times the average flow based upon full anticipated development of the tributary area. This is equivalent to carrying two times the average daily flow at half-full flow. All pumping stations shall be designed to handle the peak flows.

Sewers shall be designed to flow with a minimum velocity of two feet per second and a maximum velocity of ten feet per second at full flow based on Kutter's or Manning's Formula with $n=0.013$. Inverted siphons shall be designed for minimum velocity of three feet per second and a maximum velocity of six feet per second.

Sewers shall be designed to be oriented a minimum of 10 feet horizontal separation from all other utilities. Where the sewer crosses any other utility, the crossing shall be such that the interior angle formed between the two pipe alignments is no less than 45 degrees. The vertical clearance between crossing pipes shall be a minimum of 18 inches (pipe wall to pipe wall). Where this minimum clearance is not practical, the clearance may be reduced to 6 inches, provided that a concrete saddle the width of the pipe trench is placed between the pipes, as shown on the Standard Construction Details. If the sewer is installed first, and an overhead utility pipe is proposed to be installed as part of the project, the sewer shall be provided with a concrete encasement within 5 feet of the proposed location of the utility. Whenever the sewer crosses over any other utility, the sewer shall be fully encased within 5 feet of the centerline of the other utility pipe. No pipe joints will be allowed with said encasement, and shorts may be required to achieve this.

All pipes shall be provided with a minimum 4 feet of cover. Where this minimum cover is not practical, Polyvinyl Chloride Pipe (PVC) shall be fully encased in concrete or ductile iron pipe of appropriate class shall be utilized. Changes in pipe material are not allowed, except at manholes. Accordingly, each pipe run from manhole to manhole shall be of a single pipe material.

No illegal connections may be proposed as part of a sewer system. Illegal connections include connections from any storm sewer, house drain (non-sanitary), sump pump, yard drain other non-sanitary unit. The design shall clearly show that all structures designed to be served by the proposed system are provided with a suitable location for the proper discharge of these non-sanitary flows.

The Applicant's Contractors will be responsible for locating and protecting all existing utilities including, but not necessarily limited to, water, steam, oil, gas, sanitary sewers, storm sewers, drains, telephone ducts and electric conduits, cable TV lines, or any other similar facilities which may be encountered during the owners of such utilities for their aid and assistance in locating and protecting them and shall pay all charges, costs and expenses in connection therewith. He shall also provide the Authority with copies of the correspondence requesting the stake-outs for the various utilities.

2. Pipe Material

Materials used in the construction of sewers, force mains and outfalls shall be as follows; gravity sewers shall

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be constructed of Prestressed Concrete Cylinder Pipe (PCCP), Polyvinyl Chloride Pipe (PVC), SDR 35 push-on only or Ductile Iron Pipe (DIP). Cleanouts shall be constructed of CLASS 54 DIP, or PVC. Inverted siphon, force mains and outfalls shall be constructed of DIP unless otherwise permitted by the Authority. Inverted siphons shall have a minimum of two pipes with provision for flushing. Flow control gates shall be provided in all chambers.

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

a. Prestressed Concrete Cylinder Pipe (PCCP)

Prestressed concrete (lined) cylinder pipe in sizes 16" through 144" shall meet all requirements of AWWA C-301-92. Restrained joints shall be used to dissipate all thrust forces. Pipe shall be designed to withstand a live load equal to American Association of State Highway and Transportation Officials (AASHTO) H-20 Loading. Interior of pipe, fittings and mortared joints shall be lined with two coats of a coal tar coating. Pipe and fittings shall be shop coated. Pipe shall be furnished in maximum standard lengths of 20 feet.

b. Polyvinyl Chloride Pipe (PVC)

Plastic pipe shall be polyvinyl chloride sewer pipe with bell and spigot ends with O-Ring rubber gasketed joints and conforming to ASTM D-3212. Plastic pipe and fittings for mains and laterals shall conform to ASTM D 3034 (latest revision) with a minimum wall thickness designation of SDR 35 for pipe 4 to 15 inches in diameter; and ASTM F-679 for pipe 18 inches in diameter, with a uniform wall thickness. PVC may not be used for piping greater than 18 inches.

The plastic material from which the pipe and fittings are extruded shall be high 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 D-1784.

Pipe shall be free from defects, bubbles, UV deterioration coating defects and other imperfections in accordance with accepted commercial practice.

Rubber ring gaskets shall be manufactured as per ASTM D-477. The gasket shall be the sole element as specified in ASTM D-2321. In no case shall less than Select Material No. 6 (NJDOT Gradation I-2) be used for bedding and haunching material unless approved on writing by the Authority. Particular attention should be given to the special requirements for installing pipe in unstable soil or in excessive groundwater.

c. Ductile Iron Pipe (DIP)

Ductile iron pipe shall be centrifugally cast in metal or sand lined molds to ANSI Specifications A21.51. The joint shall conform to the requirements of ANSI A 21.11 and be of a type that employs a single elongated grooved gasket to effect the joint seal, such as United States Cast Iron Pipe Company's Tyton Joint, James B. Clow and Sons, Inc., "Bell-Tite", or approved equal. Pipe shall be furnished with flanges where connections to flanged fittings are required. Pipe shall be Class 54, minimum. The outside of the pipe shall be coated with a uniform thickness of hot applied tar coating and the inside shall be lined with cement in

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accordance with AWWA C-104. All ductile iron pipes shall be polyethylene encased in accordance with AWWA C105/A21.5.

Where acid soils are encountered, additional precautions shall be taken as recommended by the manufacturer.

d. Joints

Joints for sewer pipes shall be as specified below:

Reinforced Concrete Pipe:	Steel and Rubber Gasket (AWWA C-302)
Prestressed Concrete Cylinder Pipe:	Steel and Rubber Gasket (AWWA C-301)
Polyvinyl Chloride:	Equal to FLUID-TITE (ASTM D-477)
Ductile Iron Pipe:	Equal to TYTON (ANSI A-21.11)

Where a new pipe material must be adapted to an existing and different pipe material, Furnco type joint connectors may be utilized, if approved by the Engineer.

e. Bedding

All bedding, cradles, and encasement shall be in accordance with the manufacturer's recommendation for each pipe material, depth and soil condition. For RCP, PCCP, PVC and DIP, bedding shall not be less than the requirements as shown on the Standard Construction Details.

3. Manholes

Manholes shall be provided at ends of sewer lines, at intersections and at changes of grade or alignment. Distance shall not exceed 300 feet for 18 inches diameter pipe or less, or be greater than 400 feet for larger pipe sizes. Manholes shall be provided with a minimum 0.10 foot interior drop. Where lateral sewers enter manholes, and the difference in crown elevation, between the influent and effluent pipes is equal to or greater than two feet, drop pipes shall be provided and drop manholes shall be built.

Manholes shall be precast concrete with an exterior seal coating of coal tar epoxy acceptable to the Authority, with enough time allowed for proper bond between seal coats. Manhole interiors shall receive two coats of white DURA-Plate USH Amine Epoxy or equal.

Concrete block manholes will only be used for special construction conditions which prevent use of precast manholes. Base sections of precast drop manholes shall be integrally cast at the factory.

When precast manhole barrels and cones are used, they shall be reinforced concrete pipe and fittings formed to ASTM C-478, with round rubber gasketed joints conforming to ASTM C-361 or double butyl rubber sealant meeting ASTM C-990.

Maximum absorption shall be 8% in accordance with ASTM C-76.

Manhole frames and covers shall be of cast iron conforming to ASTM A-48 Class 30 and be suitable for

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AASHTO-H20 loading capacity. All frames shall be 8 inches high, and shall have nominal diameters of either 24 inch or 30 inch. Use of manhole grade rings is not acceptable.

All manhole covers in easements or in remote areas shall be provided with a locking device and shall be set a minimum of 1' above grade.

All covers shall be 24 inch nominal diameter.

Locking frames and covers shall be utilized in all easement areas and in areas required by the Engineer. Watertight, locking frames and covers shall be utilized where applicable, and in areas required by the Engineer, and shall conform to applicable ASTM specifications.

All sanitary sewer lids shall be vented, as shown on the ELSA Standard Detail.

Watertight manhole inserts shall be provided on all new manholes, and on manholes proposed to be modified.

All manholes shall have the word 'SEWER' cast in cover in 2.5 inch high letters. All manholes on sewers to be dedicated to ELSA shall also have "E.L.S.A" cast in the cover in 2.5 inch high letters.

Watertight manholes inserts shall conform to the ELSA Standard Detail.

Manholes shall be supplied with suitable flexible watertight sleeve connections integrally cast into all pipe openings, with capability of deflecting a minimum of nine degrees.

Manhole steps shall be copolymer polypropylene plastic meeting ASTM C478 and shall be at least 5 7/8" deep, 12" wide and with a 1/2" Grade 60 reinforcing rod.

Discharge Manholes at the end of a force main shall have a PVC liner.

Connections to existing manholes shall be core drilled and have Link-Seal or Kor-N-Seal connections. Link-Seal shall be grouted inside and outside.

4. Inverted Siphons

Inverted siphons, if permitted, shall not have less than two barrels. Provisions shall be made for rodding and for flushing. Velocity shall not be less than three feet per second nor greater than six feet per second. Flow control gates in chambers shall be provided in all chambers.

5. Connections and Cleanouts

The wet connection and the connection from the lateral to the buried wye cleanout shall be installed as per the Authority Rules and Regulations by a licensed plumber. All connections from the inspection cleanout to the private sanitary facilities shall be in accordance with the local Building Department. Connections from the cleanout to the dwelling are under the jurisdiction of the building department through its plumbing inspector.

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His approval will be required before the Authority will accept discharge of sewage into its mains.

No illegal connections may be proposed a part of a sewer system. Illegal connections include connections from any storm sewer, house drain (non-sanitary), sump pump, yard drain or other non-sanitary unit. The design shall clearly show that all structures designed to be served by the proposed system are provided with a suitable location for the proper discharge of these non-sanitary flows.

Sewer connections shall be made to a street main in the presence of Authority personnel. Connection to the sewer shall be made through an approved wye, saddle or other types as may be approved by the Authority. Only one facility per connection is permitted unless approved by the Authority.

Connections shall be 6 inch in diameter and installed in accordance with the attached Standard Construction Details. All laterals shall be installed perpendicular to the sewer main, and shall contain no bends except as required at the point of connection (see details). Laterals located at the end of a sewer main (terminal manhole) may be tied directly into the terminal manhole, provided that the lateral contains no bends and the direction of the lateral from the manhole to the cleanout is clearly evident from visual inspection inside the manhole.

Connections into existing sewer mains shall be coordinated with the Authority prior to the connection. The materials shall be extra heavy thickness conforming with the requirements of ANSI Specification A-74. Neoprene gasket joints shall conform to ASTM C-564. All saddle connections shall be installed with the Authority's special cutter, under the direction of the Authority. The saddle connections to the vitrified clay pipe shall be made with a Model D-3034 for SDR 35 as manufactured by the General Engineering Company, Frederick, MD.

All connections must have a buried wye cleanout, with a plug, placed one foot behind the face of the curb. If curbs are not in existence, the cleanout shall be located one foot within the Right-of-Way or Easement. Cleanouts shall not be situated in sidewalk or driveway areas. Buried wye cleanouts shall not exceed 6 feet depth and shall be marked with two #4 reinforcing rods set vertically and adjacent to this wye.

Chimneys shall be required where the invert of the lateral at the cleanout is greater than 2 feet above the top of the sewer main at the point of connection. Chimneys shall be constructed vertically on top of the main and encased in concrete. The top of the chimney shall be provided with a 45 degree wye (with a cap on the vertical leg) and followed immediately by a 45 degree street bend. Chimneys installed on existing sewer lines shall be precast units designed to bridge the existing lateral and distribute the vertical directly onto the pipe bedding material.

The Applicant's Contractor shall be required to obtain and pay for any and all necessary Road Opening Permits.

6. Pumping Stations

All pumping stations shall be provided with the following as a minimum and as generally shown on the Standard Construction Details. The Authority may require more stringent or additional criteria as it deems appropriate.

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a. Wet Well

- i. It shall be a minimum of six feet in diameter up to grade and be comprised of reinforced concrete manhole sections as per manhole details. It shall be sized to provide a maximum detention time of ten minutes when flow is at the average dry weather rate. The wet well bottom shall be filleted to prevent accumulation of solids. All suction pipes shall be 90 degree flared elbows.
- ii. All raw sewage must be comminuted and screened using a Muffin Monster type comminutor with a bypass and a basket strainer, respectively. A hoist shall be provided for removal of equipment and screenings. The strainer/hoist system shall be designed to allow removal of screenings without entry into the wetwell.
- iii. Forced air ventilation shall be provided to accommodate a minimum of 12 air changes per hour using an exterior mounted blower in a weatherproof enclosure. Fresh air shall be supplied via a PVC duct terminating one foot above the grating platform cited below.
- iv. Explosion proof lights with protective screens shall be provided in the wet well. A manual on-off switch shall also be provided although the lights and blower shall turn on automatically upon opening of the access hatch.
- v. All equipment and fixtures within the wet well shall be explosion proof, dampproof and non-corrosive, and shall be in conformance with applicable standards.
- vi. All exterior mounted equipment shall be watertight and vandal proof.
- vii. Wet well interior shall be coated with two equal coats of High Build Epoxy Polyamide equivalent to a minimum dry film thickness of eight miles.
- viii. Grating platform(s) shall be provided so that no vertical descents are greater than 10 feet. Platforms shall be full diameter of the wet well interior, shall be provided in removable sections, and shall have banded cutouts for all pipe and access penetrations. For interior wet wells larger than 25 square feet, a minimum 16 square foot landing shall be provided at each level.
- ix. Aluminum access ladder(s) shall be provided and located 90Eoff axis of the influent sewer pipe.
- x. Individual aluminum access hatches and hand holds shall be provided over both the debris basket and the access ladder. Hatches shall be waterproof and lockable.

b. Dry Well

- i. The dry wells shall be constructed of precast concrete manhole sections in accordance with the Standard Construction Details or of extra thick steel (1/2"chamber, 3/8" entrance tube) with anode bags as required by the manufacturer.

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- ii. The dry well shall be completely separate from the wet well and shall be deep enough to maintain a positive suction head to the pumps. All raw sewage piping shall be flanged ductile iron.
- iii. Sufficient space shall be provided, for maintenance and removal of equipment, with a minimum eight foot diameter.
- iv. A minimum of two pumps shall be provided, each capable of pumping the peak flow rate. If more than two pumps are necessary, their capacity shall be such that upon failure of the largest pump, the others will handle the peak flow.
- v. Pumps shall be vertical, close coupled, non-clog centrifugal sewage pumps with mechanical seals and shall be provided with hand holes and lifting eyes. Both the casing and impeller shall be constructed of cast iron with passages large enough to pass a minimum of a 3-inch solid.
- vi. Pump motors shall have a minimum service factor of 1.15 and shall be non-overloading through the full operating range of the pumps. The motors shall be designed to operate with the specified pump.
- vii. Pump operation shall be controlled by a bubbler system consisting of two automatically alternating compressors with a common tank and copper or stainless steel bubble tubing. A purge valve shall be provided on the compressor line outside the dry well.
- viii. The bubbler tubing and the line between the wells shall be in galvanized steel sleeves.
- ix. Each pump shall be isolated from the system by plug valves provided on both the suction and discharge connections.
- x. For deep stations, an intermediate level with removable gratings shall be provided.
- xi. All electric service from the utility company shall be three phase, 60 hertz.
- xii. Controls shall be enclosed in an approved panel with running and alarm lights. All pumps shall be provided with variable frequency drives. Pumps shall alternate automatically upon each start. Alarms shall be installed independently of station power and shall give warning of high and low water levels, pump failure, loss of power, bubbler system failure, high water level in dry well and unauthorized entry. The indicator lights shall be connected such that the light indicating cause of the alarm shall be connected to a red alarm light mounted on the generator building and remotely by telemetering to the Authority's main treatment plant. All equipment shall be provided with remote manual disconnects with lockouts for servicing of the equipment.
- xiii. Ancillary equipment within the dry well include a unit heater, dehumidifier, exhaust fan, sump pump and lighting. All equipment shall be provided with applicable instrumentation and controls.

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- xiv. A complete set of manufacturer-recommended spare parts shall be provided. In addition, any special tools necessary for maintenance or repair shall be provided.
 - xv. When required by the Authority, sufficient space shall be provided in the dry well or the generator building to accommodate a complete chlorination facility. As a minimum, the facility accessories shall include a scale, vacuum regulators, injector and safety equipment.
 - xvi. Interior walls of the dry well shall be coated with two equal coats of epoxy polyamide green to achieve a total minimum dry film thickness of 3.5 mils. All equipment and piping shall be coated as per the manufacturer's instructions. The floor of the dry well shall be covered by a rubber mat.
- c. Generator Building
- i. All pumping stations shall be provided with a natural gas or liquid propane gas powered generator as an auxiliary power source. The generator shall be the closed loop, radiator cooled type provided with a residential type muffler. The generator shall be sized to provide the total electric needs of the pumping station and ancillary equipment including the starting and operation of both pumps. All equipment starters must be provided with the delay relays to prevent simultaneous starting upon activation of the generator. All exhaust piping shall be insulated and shielded.
 - ii. Generator accessories shall include a control panel with indicating lights, a jog button for generator exercising, and an automatic transfer switch for total package responsibility.
 - iii. Generator instrumentation shall include, as a minimum, the following:
 - (a) Ammeter
 - (b) Cycle Meter
 - (c) Voltmeter
 - (d) Elapsed time running indicator
 - iv. Control circuitry for the generator and transfer switch shall include, as a minimum, the following:
 - (a) Voltage drop protection
 - (b) Time delay at start (0-60 sec)
 - (c) Time delay for transfer of load (0-60 sec)
 - (d) Time delay for retransfer (0-60 sec)
 - (e) Time delay to off for cooldown (0-5min)
 - v. The generator and controls shall be housed in a brick and block superstructure with a shingled, gabled roof.
 - vi. A red alarm light in a vandal-proof cage shall be installed on the building roof and shall light to indicate any of the alarm conditions delineated earlier. The light shall be visible from the adjoining street.

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d. Force Main

- i. Pipe material shall be cement coal tar epoxy lined ductile iron with restrained joints, where required.
- ii. Minimum force main velocity shall be two feet per second at the average pumping rate and shall be a minimum diameter of four inches.
- iii. Bends shall have a maximum deflection of 45E.
- iv. Properly designed automatic air release/vacuum breaker valves shall be provided on high points of the force main, at all locations where the slope decreases, and elsewhere required.
- v. Acceptable cleanout manholes shall also be provided where necessary or as required by the Authority.
- vi. A bypass manhole shall be provided on the force main within the pumping station site, and at other location along the force main as directed by the Authority. At a minimum, bypass manholes shall be required every 1,000 feet.
- vii. Green metallic marking tape (SANITARY SEWER BELOW) shall be installed 18" above the pipe.

e. Pumping Station Site

- i. All pumping stations shall be located in areas that are not subject to flooding and that are accessible to vehicular traffic.
- ii. Each pumping station must be on a lot meeting the minimum standards of applicable municipal, county and state agencies as well as the Authority.
- iii. The site shall be arranged to provide easy access to all structures.
- iv. Paved areas shall consist of three inches of FABC and five inches of bituminous stabilized base course on an acceptable, compacted subgrade or gravel subbase.

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F. APPROVAL OF PLANS BY STATE AGENCIES AND OTHERS

The Applicant shall be aware that certain projects must obtain approval from the New Jersey Department of Environmental Protection. All work required to obtain the Construct and Operate Permit from the NJDEP shall be performed by the Applicant. If the proposed system will be dedicated to the Authority, the application shall be prepared by the Applicant in the name of the Authority. Approval of the proposed systems must be obtained from the New Jersey Department of Environmental Protection before the commencement of construction. Currently, permits from the NJDEP are required for the installation of a sewer system if the system: (1) is located in a public Right-of-Way; (2) is in an easement which is located on more than two properties; (3) serves more than two structures; or, (4) conveys more than 8,000 gallons per day, design flow. The Applicant shall obtain permits for all stream crossings or encroachments from the NJDEP. Permission to construct sewers or other structures within the rights-of-way of State, County and municipal roads as well as all railroads or utility companies must be secured and paid for the Applicant. Proof of certification by the Mercer County Conservation District must be submitted.

If the proposed system is located in a State or County roadway, the Applicant shall obtain the proper occupancy permit in the name of the Authority. The Applicant shall also execute the Authority's hold-harmless and indemnification form. In addition, the Applicant, or his contractor, shall provide an acceptable insurance certificate indicating the Authority (including its agents) as a named insured.

Submittal of application, fees, plans, specifications and other supporting documentation required by agencies other than this Authority shall not be initiated until the Authority has granted unconditional final approval. The Applicant must secure any necessary clearance from any other public utilities involved. The applicant shall obtain the stakeout of all existing utilities.

The Authority and the Authority's Engineer shall be provided with three (3) sets each of complete and fully approved plans for the purpose of inspection of construction.

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G. INFORMATION OF CONSTRUCTION OF SEWERAGE

1. Shop Drawings

Prior to construction, the design engineer shall submit to the Authority four shop drawing of the pumps, motors, generator and other equipment for which drawings are customarily required. The Authority review of shop drawings will be general and shall not relieve the applicant and his designer from the responsibility or liability for the details of design and dimensions necessary for proper fitting and construction of the work.

Shop drawings shall show the principal dimensions and construction detail. When it is customary to do so, or when the dimensions are of particular importance, the drawings shall be certified by the manufacturer as correct for this project.

No equipment shall be purchased or fabricated until the Authority Engineer has reviewed the shop drawings. No work shall be done upon any part of a structure, the design or construction of which is dependent upon the features for which the review is required until comments have been solicited by the designer.

2. Operation and Maintenance Manuals

After construction and before consideration of acceptance by the Authority, the applicant is to furnish the Authority four sets of Operation and Maintenance Manuals for facilities constructed.

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H. INSPECTION, TESTING AND CERTIFICATION OF SEWERAGE

1. Inspection

The Authority Engineer, either directly or through inspectors under his supervision, shall make periodic observations of the construction of the sewerage. He will enforce compliance with the approved plans and specifications and he will have the authority in conjunction with the Authority to have the work discontinued in the event of non-compliance. This inspection does not relieve the Design Engineer from his responsibility and liability as a representative of the Applicant and as designer of the project.

If the contractor's construction plans differ in any respect to the approved plans, same will be supplied to the Authority for their review and approval prior to any commencement of work. If the contractor is found, during any phase of the project, to be utilizing plans for construction which are not approved by the Authority, work will be discontinued.

The Applicant or his Contractor shall furnish all labor, material and equipment necessary for the stages of construction inspection. The applicant shall give 10 days notice to the Authority prior to the initial startup of any construction activities. The applicant shall give 48 hours notice to the Authority prior to construction of sewers at any time during the construction of the project.

a. First Stage - Construction

Observation of the installation of sewerage in accordance with and as depicted in approved plans and specifications as well as in accordance with these Rules and Regulation including the checking of pipe class, materials, bedding and general layout.

No sewer connections shall be made to an existing street main, whether tested or not, unless under the supervision and inspection of an Authority representative.

b. Second Stage – Testing

After sub base, base course and curb is complete, sewers will be subject to an infiltration or air pressure test. PVC and DIP sewers will be subject to a mandrel test. Manholes shall be subject to an exfiltration test. Sewers will be videotaped by the Authority utilizing equipment provided by the Authority, or by an approved independent video contractor provided by the Developer, at the option of the Authority.

c. Third Stage - Final

The Developer shall notify the Authority prior to final paving for final inspection. After final course paving has been completed, manhole frames shall be checked for proper elevation, shifting or damage. Manholes and piping shall be checked for cleanliness. Inspection cleanouts shall be checked for cleanliness and general workmanship damage, elevation and proper plugs. The interior of connected structures shall be checked at the location where the interior plumbing exits the structure for proper location and for any illegal connections, or potential locations for illegal connections. Spot checks of manholes and of the site shall be made before release of the Maintenance Bond.

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2. Testing

All gravity sewers and force mains shall be subjected to either infiltration or exfiltration testing. The Authority Engineer shall be notified one week in advance of any testing.

All tests shall include the street main as well as house connections up to and including the buried cleanout. If the test method for the street main does not include the cleanout, then separate tests shall be performed on each cleanout by a method approved by the Authority.

A temporary, leak-proof, bulkhead type plug shall be installed in the upstream (inlet) side of the manhole furthest downstream in any sewer main or branch under construction and shall remain intact until a written permit to operate has been granted. This permission will not be granted until each section of the sewer has been cleaned and flushed in a manner acceptable to the Authority.

a. Infiltration Testing

An infiltration test shall be performed for those lines where the ground water level is at least two feet higher than the top of the pipe at the upstream manhole. Where ground water level is lower than two feet above the top of the pipe at the upstream manhole, an exfiltration test shall be performed. Water testing or air testing may be used for the exfiltration test.

Infiltration rates shall be determined on the main line and laterals and shall be within allowable rates. Rate of infiltration shall not exceed 20 gallons per mile per inch of diameter of pipe for 24 hours. The phrase "per mile" shall refer to the total length of main sewer, measured through manholes, plus the lengths of all connections, laterals and branches.

The contractor shall construct all bulkheads and shall provide weirs or other means of measurement, pumps, water, plugs, fittings, meters, light, hoses and all labor, material and equipment and all else necessary for testing.

The pipe section being tested shall be entirely free from any and all debris, stones, sand and any other materials. Water used in flushing the lines shall not be discharged into clean sections of pipelines or active sewers.

When performing an infiltration test, the contractor shall block off sections of the system, as required, and install a measuring device at the downstream end of the test section. Infiltration shall not exceed the allowable specified. If the actual infiltration exceeds the allowable infiltration or if there are visible signs of infiltration such as gushing or spurting streams, the contractor shall effect all repairs necessary to make the pipe sufficiently watertight. The section shall be retested until the rate of allowable infiltration is met.

b. Exfiltration Testing

Exfiltration rate shall be determined in the main line and laterals and shall be within allowable rates. Rate of exfiltration shall not exceed twenty gallons per mile per inch of diameter of pipe for 24 hours. The phrase "per mile" shall refer to the total length of main sewer, measured through manholes, plus the lengths of all

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connections, laterals and branches.

All wyes, tees and other fittings in the mains shall be adequately capped or plugged to withstand the maximum anticipated head during exfiltration testing and to prevent debris and groundwater from entering during infiltration testing. All caps or plugs which "blow-out" or leak shall be replaced as often necessary by the contractor until the main line passes the exfiltration test. All lines not in compliance with these requirements shall be corrected by the contractor until such time as the rate can be met.

The water exfiltration test shall be performed between consecutive manholes. After water has been introduced into the section and all air expelled, a stabilization period shall be allowed for absorption of water. The water level shall then be raised to two feet above the groundwater level, but in no case shall the test water level be less than two feet above the top of the pipe at the upstream manhole. The quantity of water required to maintain this level over a forty-eight hour period shall be measured. Exfiltration shall not exceed the allowable as specified. If the actual exfiltration exceeds from the pipe, the contractor shall effect all repairs necessary to make the pipe sufficiently watertight. The section shall be retested until the rate of allowable exfiltration is met.

c. Air Testing

Air testing may be used instead of the water exfiltration test to measure exfiltration. Each manhole reach shall be tested individually. Each end of pipe, all branches, laterals and wyes shall be plugged and securely braced. The plug at each end of pipe shall have provision to connect an air hose.

Air shall be supplied to the section and monitored so as not to exceed 5.0 psig. An independent air gauge, 0-15 psig, and line shall be installed on the opposite plug to the air supply such that the gauge can be read at the ground surface. The air pressure shall be maintained between 4.0 and 3.5 psig for at least two minutes to allow air temperature to come to equilibrium with pipe walls. The air supply then be disconnected and the air pressure allowed to decrease to 3.5 psig. At 3.5 psig the time shall be measured for the pressure to drop 2.5 psig.

The following table shows the allowable time for a loss of 0.5 psig at an initial pressure of 3.5 psig.

Pipe Size Inches	Allowable Time in Minutes –Seconds
6 @ 3.5 psig	2 - 50
8 @ 3.5 psig	3 - 57
10 @ 3.5 psig	4 - 43
12 @ 3.5 psig	5 - 40
15 @ 3.5 psig	7 - 05
18 @ 3.5 psig	8 - 30
20 @ 3.5 psig	9 - 55
24 @ 3.5 psig	11- 20
27 @ 3.5 psig	12- 45

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If the actual time for a loss of 1.0 psig is less than the allowable time shown in the above table, the contractor shall determine the source of leakage and effect all repairs necessary to make the pipe sufficiently airtight. The section shall be retested until the allowable time is met or exceeded.

d. Mandrel Test

All PVC and DIP sewer mains shall be subject to a mandrel test. The dimensions of the mandrel shall be reviewed and approved prior to the commencement of mandrel testing. The mandrel shall be so designed to easily pass through a pipe section with an effective diameter equal to 95 percent of the true diameter or 5E deflection.

If the mandrel may not be pulled through the pipe reach, the test is considered failed, and the contractor shall employ his resources to correct the failed section.

The mandrel shall be pulled through each pipe by the use of manpower only. Come-a-longs, pulls, winches and other mechanical equipment shall not be used. Should a mandrel become stuck, the contractor may employ mechanical efforts to remove the mandrel. After repair to the pipe, the main shall be air tested again and subject to mandrel testing.

e. Hydrostatic

To test force mains, the contractor shall fill the pipe with water in such a manner as to expel all air. If the Applicant elects, he may test the pipe as a whole or in convenient sections as approved by the Authority Engineer. The pipe shall then be subjected to a pressure test two times the maximum operating pressure or 150 psig, whichever is greater, for a two-hour period. Any leaks on defective joints shall be satisfactorily repaired or replaced and the test repeated until the line shows no leakage.

All force main cleanout assemblies and air release assemblies shall be included in the tests. The air release valve assembly shall be observed for expulsion of air during the filling operation. After the force main is full, the lower outlet valve on the release valve shall be opened to verify the pressure of water up to that level.

f. Pump Stations

Pumping stations will be tested for operation and checked for compliance including but not limited to the following items:

- i. Individual and simultaneous operation of pumps and motors on normal and emergency power;
- ii. Automatic alternation of pumps and motors on normal and emergency power;
- iii. Alarm system;
- iv. Generator and appurtenances;
- v. Bubbler and compressor system;
- vi. Sump pumps;
- vii. Lighting, heating and ventilation in the wells and the generator building;
- viii. Fencing, landscaping and paved areas;

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- ix. General cleanliness of the site;
 - x. Satisfactorily implementation of “check list” items resulting from the above.
- g. Video/DVD-R Recording

The entire length of the installed gravity sewers shall be video recorded, and the video DVD-R shall be delivered to the Authority. All video recordings shall be in color and narrated to provide information on location of house connections and other features. Camera speed shall not exceed 30 feet per minute.

All sewers shall be thoroughly cleaned prior to video inspection.

The Authority reserves the right to perform the video *recording* with their own equipment and personnel or require the Contractor to provide this service. The Applicant shall provide personnel for traffic control and labor to assist the Authority personnel. Video performed by the Authority shall be paid for in accordance with fee established by the Authority in the event that video inspection must be repeated. The Contractor shall pay additional fees in accordance with the established rate.

3. Certification

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a. "As-Built" Plans

The Applicant shall prepare "as-built" drawings containing the information itemized herein. The drawings shall be on 24" x 36 reproducible mylar. One set of mylar and four (4) sets of black and white prints shall be provided to the Authority. Electronic files of the as-built drawings shall also be provided in PDF and DWG format. The electronic file shall be on the latest version of AutoCAD and shall be on a DVD data disk.

- i. Drawings shall show the both plan view and profile at a scale of 1"= 50' horizontal; 1" = 5' vertical. The plan shall be above the profile on each drawing.
- ii. USGS datum.
- iii. Location of permanent benchmarks within the project area.
- iv. Manholes shown and numbered for on-site and off-site facilities. A table showing latitude and longitude of each manhole shall be provided to the hundredths of a second.
- v. Rim and invert elevations in and out at each manhole.
- vi. Pipe lengths, sizes, material, direction of flow and slopes shall be shown along each pipe length between the manholes.
- vii. The building connection to the main will be shown by reference to stationing from the downstream manhole of each pipe section.
- viii. The location of the buried wye cleanouts shall be shown by reference to stationing from the center of downstream manhole, and by perpendicular offset distance from the main to the cleanout.
- ix. Information relating to the location of cleanouts indicated by triangulation from permanent structures or features may also be shown on the plans.
- x. All easements shall be shown. Filed easements shall indicate book number, page number and date recorded.
- xi. All Tax Map information such as lots, blocks, street addresses and easements shall be shown.
- xii. Key map showing the project location within Township.
- xiii. Title box indicating that these are "as-built" with date of preparation.
- xiv. All information shall be certified by the Engineer who prepared the design plans.

Pipes installed at slopes less than shown on the design drawings or sags greater than 1 inch shall be reinstalled by the Contractor to the design slopes or the Design Engineer shall provide a design report prepared and sealed by a Professional Engineer showing the theoretical capacity and velocity of the pipe as

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installed based on total energy head and the pipe manufacturer “n” value. The theoretical velocities and capacities shall be submitted to the Authority for evaluation. If the theoretical capacity and velocity meet the design requirements, the line will be acceptable.

If the theoretical capacity and velocity do not meet the design requirement, the contractor shall conduct a flow test to determine the velocity and capacity with the pipe flowing one-half full. If the actual velocity and capacity meet the design requirement, the line is acceptable. Otherwise, the line shall be relaid to the slope as shown on the design drawings. In any case, the Authority retains the right to have the Applicant relay any line not meeting the minimum slope required, at the Applicant’s expense.

b. Local Agency Approval

The Design Engineer shall concurrently submit with the “as-built” plans two original signed and sealed Certifications of Approval by Local Agency (NJDEP Form WQM-005) wherein he shall certify the constructed sewerage. The Authority Engineer will similarly certify for inspection and testing.

No active service connections will be permitted by the Authority without the issuance of the Approval to Operate by Local Agency (NJDEP Form WQM-008).

I. ACCEPTANCE OF NEW SEWERAGE BY THE AUTHORITY

The Authority will consider formal acceptance by resolution of the completed sanitary sewerage after satisfactory completion of the following items by each entity:

1. Duties of the Applicant

- a. Formally request by letter the acceptance of the system and a release from the performance guarantee.
- b. Submit a maintenance guarantee in the form of a bond or in cash for a period of one year from the date of the acceptance resolution. The maintenance bond shall guarantee the remedy of any defects which occur or become evident during the one year period.
- c. Submit one 18" x 36" linen tracing or mylar as well as two sets of 18" x 36" prints of the “as-built” plans.
- d. Submit deeds, meters and bounds descriptions, two certified copies of the final subdivision map and proof of Title for all lands and easements to be dedicated to the Authority. The

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above are to be in a form acceptable to the Authority Attorney.

- e. Submit warranties for all equipment as well as any guarantees extending beyond the one year maintenance period.
- f. Submit an Affidavit which certifies that all facilities are free of liens or other encumbrances and which holds the Authority harmless from any potential liability.

2. Duties of the Authority

The Authority shall:

- a. Release the Applicant from the performance guarantee and accept the maintenance guarantee.
- b. Accept title to all land, easements and sanitary facilities.
- c. Operate and maintain the systems thereafter.

3. Use of Sewerage by the Authority

During construction and final acceptance, the Authority shall have the right to use any portion of the Applicant's completed system without waiving its rights to order the correction of any defect.

J. COMPLIANCE WITH RULES AND REGULATIONS

The Applicant, Owner and/or User as may be applicable, shall comply with all of the rules and regulations as set forth herein and the Rules and Regulations Covering All Discharges to The Wastewater Treatment Works of the Ewing-Lawrence Sewerage Authority. Failure to do so may result in an immediate work stoppage directive, disconnection, penalty in accordance with Section 6.7 of the Rules and Regulations Governing All Discharges to the Wastewater Treatment Works of the Ewing-Lawrence Sewerage Authority, and/or other such action as may be deemed appropriate by the Authority in the particular circumstances.

K. STATE HEALTH AND FEDERAL REGULATIONS

The applicant and his designees, contractor's and subcontractor's, shall be responsible for complying with all federal, state and local laws and regulations, including health and safety.

L. PREVIOUS RULES, REGULATIONS AND RESOLUTIONS

Any previous rules, regulations and resolutions heretofore adopted by the Authority which are inconsistent with this resolution are hereby rescinded.

M. EFFECTIVE DATE

These Rules and Regulations shall be effective immediately and are subject to revision or amendment by

***Ewing-Lawrence Sewerage Authority
Construction Rules and Regulations***

the Ewing-Lawrence Sewerage Authority.

***Ewing-Lawrence Sewerage Authority
Construction Rules and Regulations***

N. APPLICATION FORMS

PRELIMINARY APPLICATION

EWING-LAWRENCE SEWERAGE AUTHORITY

APPLICATION FOR REVIEW OF PRELIMINARY PLANS FOR SEWERAGE CONSTRUCTION IN

EWING AND LAWRENCE TOWNSHIPS, COUNTY OF MERCER, STATE OF NEW JERSEY. (This application must be filed in duplicate, accompanied by application and review fees as prescribed in the Fee Schedule, with the Executive Director of the Authority, 60 days in advance of the Meeting of the Authority).

Application is hereby made for preliminary review of the proposed Project.

Name of Project: _____

Applicant:

Name: _____ Phone: _____

Address: _____

Email address: _____

Interest if other than Owner: _____

Present Owner:

Name: _____ Phone: _____

Address: _____

Plans Prepared By:

Name: _____ Phone: _____

Address: _____

Location and description of proposed Project:

Area of entire tract: _____

Residential/Commercial: _____

Portion being sewered: _____

Contributory Flow: _____

Number of Lots: _____

Square footage of Buildings: _____

Does applicant or owner intend to convey by deed to the Authority easements to all areas on preliminary plan showing sanitary sewer and all rights to sewer system? Yes _____ No _____

List plans and other material accompanying application and number of each.

<u>Item - Description</u>	<u>Number</u>
_____	_____
_____	_____
_____	_____
_____	_____

The Applicant understands that the capacity/connection fees required under this application are for this project only. In the future, if the applicant, it's successors or assignees expands the project, changes or expands the use or does anything that increases the sewage flow above that stated in this application, the Authority will be entitled to assess additional capacity/connection fees, pursuant to the current Authority Rules and Regulations.

Accepted and Agreed to by the Applicant

Applicant Name: _____

Address: _____

Email address: _____

Phone: _____

Signature of Applicant: _____ Date: _____

Make all checks payable to the Ewing-Lawrence Sewerage Authority.

Do not write below this line

Date received and fee collected by Executive Director:

_____	_____
Date	Fee Paid

Action of the Ewing-Lawrence Sewerage Authority on _____: _____
Date

Approved: _____ Approved as Noted: _____ Disapproved: _____

Remarks:

Date

Executive Director

FINAL APPLICATION

EWING-LAWRENCE SEWERAGE AUTHORITY

APPLICATION FOR REVIEW OF FINAL PLANS FOR SEWERAGE CONSTRUCTION IN EWING AND LAWRENCE TOWNSHIPS, COUNTY OF MERCER, STATE OF NEW JERSEY. (This application must be filed in duplicate, accompanied by application and review fees as prescribed in the Fee Schedule, with the Executive Director of the Authority, 60 days in advance of the Meeting of the Authority).

Name of Project: _____

Applicant:

Name: _____ Phone: _____

Address: _____

Email address: _____

Interest if other than Owner: _____

Present Owner:

Name: _____ Phone: _____

Address: _____

Plans Prepared By:

Name: _____ Phone: _____

Address: _____

Location and description of proposed Project:

Area of entire tract: _____

Residential/Commercial: _____

Portion being sewered: _____

Contributory Flow: _____

Number of Lots: _____

Square footage of Buildings: _____

Do the final plans follow exactly the intend and details of the approved preliminary plans?

Yes _____ No _____

List plans and other material accompanying application and number of each.

<u>Item - Description</u>	<u>Number</u>
_____	_____
_____	_____
_____	_____
_____	_____

The Applicant understands that the capacity/connection fees required under this application are for this project only. In the future, if the applicant, it's successors or assignees expands the project, changes or expands the use or does anything that increases the sewage flow above that stated in this application, the Authority will be entitled to assess additional capacity/connection fees, pursuant to the current Authority Rules and Regulations.

Accepted and Agreed to by the Applicant

Applicant Name: _____

Address: _____

Email address: _____

Phone: _____

Signature of Applicant: _____ Date: _____

Make all checks payable to the Ewing-Lawrence Sewerage Authority.

Do not write below this line

Date received and fee collected by Executive Director:

_____	_____
Date	Fee Paid

Action of the Ewing-Lawrence Sewerage Authority on _____:
Date

Approved: _____ Approved as Noted: _____ Disapproved: _____

Remarks:

Date

Executive Director

SERVICE CONNECTION APPLICATION

EWING-LAWRENCE SEWERAGE AUTHORITY

APPLICATION FOR REVIEW OF SERVICE CONNECTION PLANS FOR SEWERAGE CONSTRUCTION IN EWING AND LAWRENCE TOWNSHIPS, COUNTY OF MERCER, STATE OF NEW JERSEY. (This application must be filed in duplicate, accompanied by application and review fees as prescribed in the Fee Schedule, with the Executive Director of the Authority, 60 days in advance of the Meeting of the Authority).

Application is hereby made for preliminary review of the proposed Project.

Name of Project: _____

Applicant:

Applicant Name: _____

Address: _____

Email address: _____

Phone: _____

Signature of Applicant: _____ Date: _____

Present Owner:

Name: _____ Phone: _____

Address: _____

Plans Prepared By:

Name: _____ Phone: _____

Address: _____

Location and description of proposed Project:

Area of entire tract: _____

Residential/Commercial: _____

Portion being sewered: _____

Contributory Flow: _____

Number of Lots: _____

Square footage of Buildings: _____

List plans and other material accompanying application and number of each.

<u>Item - Description</u>	<u>Number</u>
_____	_____
_____	_____
_____	_____
_____	_____

The Applicant understands that the capacity/connection fees required under this application are for this project only. In the future, if the applicant, it's successors or assignees expands the project, changes or expands the use or does anything that increases the sewage flow above that stated in this application, the Authority will be entitled to assess additional capacity/connection fees, pursuant to the current Authority Rules and Regulations.

Accepted and Agreed to by the Applicant

Applicant Name: _____

Address: _____

Email address: _____

Phone: _____

Signature of Applicant: _____ Date: _____

Make all checks payable to the Ewing-Lawrence Sewerage Authority.

Do not write below this line

Date received and fee collected by Executive Director:

_____	_____
Date	Fee Paid

Action of the Ewing-Lawrence Sewerage Authority on _____:
Date

Approved: _____ Approved as Noted: _____ Disapproved: _____

Remarks:

Date

Executive Director

TIME EXTENSION REQUEST

EWING-LAWRENCE SEWERAGE AUTHORITY

APPLICATION FOR REVIEW OF TIME EXTENSION FOR SEWERAGE CONSTRUCTION IN EWING AND LAWRENCE TOWNSHIPS, COUNTY OF MERCER, STATE OF NEW JERSEY. (This application must be filed in duplicate, accompanied by application and review fees as prescribed in the Fee Schedule, with the Executive Director of the Authority, 60 days in advance of the Meeting of the Authority).

Application is hereby made for a time extension of the proposed Project.

Name of Project: _____

Applicant:

Name: _____ Phone: _____

Address: _____

Email Address: _____

Interest if other than Owner: _____

Present Owner:

Name: _____ Phone: _____

Address: _____

Plans Prepared By:

Name: _____ Phone: _____

Address: _____

Location and description of proposed Project: _____

Date of Preliminary Approval by ELSA: _____

Date of Final Approval by ELSA: _____

Status of Project:

Reason for extension: _____

Original Construction Cost Estimate: _____

Current Construction Cost Estimate: _____
(to be completed by ELSA Engineer)

The Applicant understands that the capacity/connection fees required under this application are for this project only. In the future, if the applicant, it's successors or assigns expands the project, changes or expands the use or does anything that increases the sewage flow above that stated in this application, the Authority will be entitled to assess additional capacity/connection fees, pursuant to the current Authority Rules and Regulations.

Accepted and Agreed to by the Applicant

Applicant Name: _____

Address: _____

Email Address: _____

Phone: _____

Signature of Applicant: _____ Date: _____

Make all checks payable to the Ewing-Lawrence Sewerage Authority.

Do not write below this line

Date received and fee collected by Executive Director:

_____	_____
Date	Fee Paid

Action of the Ewing-Lawrence Sewerage Authority on _____:
Date

Approved: _____ Approved as Noted: _____ Disapproved: _____

Remarks:

Date

O. EDU DETERMINATION TABLE

TYPE OF ESTABLISHMENT	UNITS/EDU
RESIDENTIAL	
Apartments/Condos, 1 BR	2
Apartments/Condos, 2 BR	1 1/3, ea. 4 units equals 3 EDU's
Apartments/Condos, 3 BR	1
Single Family Residential; 3 BR	1
Single Family Residential; 4 BR	4/5, ea. 4 units equals 5 EDU's
Single Family Residential, 5 BR	2/3, ea. 2 units equals 3 EDU's
TRANSIT DWELLING UNIT	
Hotels	4 Bedrooms
Lodging Houses and Tourist Homes	5 Bedrooms
Motels and Tourist Cabins	5 Bedrooms
Extended Stay Motel	2 Suites
Boarding Houses	6 Boarders
CAMPS	
Campground/Mobile Trailer/Tent	3 Sites
Park Mobile Trailer	1 Site
Children's Camps	6 Beds
Labor Camps	7 Beds
Day Camps - No Meals	20 Persons
RESTAURANTS (INCLUDING WASHROOMS)	
Average Type	8 Seats
Bar and Cocktail Lounges	15 Seats
Fast Food Restaurant	20 Seats
24 Hour Service Restaurant	6 Seats
Curb Service/Drive-In-Service	6 Car spaces
CLUBS	
Residential Type	4 Members
Non-residential Type	8 Members
Racquet Clubs	3 Court-hours
Bathhouse with Showers	12 Persons
Bathhouse without Showers	30 Persons
INSTITUTIONS	
Nursing Facility	4 Beds
Assisted Living Facility	3 Beds
Hospitals	5 Beds equals/3 EDU's
Adult Day Care Center	30 Patrons
Other Institutions	2 Beds
SCHOOLS (including Staff)	
Elementary (No Shower or Cafeteria)	30 Students
With Cafeteria	20 Students
With Cafeteria and Showers	15 Students
With Cafeteria, Showers and Laboratories	12 Students
Boarding	4 Students
Child Day Care Center	30 Children

EDU DETERMINATION TABLE (continued)

AUTOMOBILE SERVICE STATIONS	
Pumps Only	2 Stations
Service Bays, add	6 Bays
Mini-market, add	2,000 Sq. Ft.
MISCELLANEOUS	
Office Buildings (gross area)	3,000 Sq. Ft.
Stores and Shopping Centers (gross area)	3,000 Sq. Ft.
Factories (8-hour shifts)*	12 Persons
Factories with Showers (8-hour shifts)*	7 Persons
Warehouse (8-hour shift)*	12 Persons
Self-service Laundries	1 Machine
Bowling Alleys	1 Alley
Picnic Parks (with Flush Toilets)	30 Persons
Picnic Parks (with Showers)	20 Persons
Fairgrounds (Based Upon Average Attendance)	60 Persons
Assembly Halls	100 Seats
Airports (Based On Passenger Use)	100 Passengers
Churches	100 Seats
Theater (Indoor)	100 Seats
Dinner Theater	15 Seats
Catering/Banquet Hall	15 Persons
Sports Stadium	100 Seats
Fitness Center	20 Patrons
Visitor Center	60 Persons
Libraries	100 Seats
Groundwater Remediation	300 Gallons/Day
*In addition, factories shall include 1EDU for each 300 gallons of process flow.	
<p>Notes:</p> <ol style="list-style-type: none"> 1. Two-family homes, multiple use properties and/or buildings shall determine the EDU for each use section, and sum the results for a total assessment. 2. Any use not explicitly described above will be assessed as follows: 1 EDU/12 persons + 1 EDU/3,000 sq. ft + 1 EDU/300 gallons per day of process flow. 3. EDU's for Multi-use Facilities shall be based on the sum of the industrial components. 4. In determining EDU's partial EDU's shall be rounded up to the next highest whole number. 	

Form EDU 6/2012

P. FEE SCHEDULES

**SEWER SYSTEM FEE SCHEDULE FOR SUBDIVISION APPLICATIONS
EWING-LAWRENCE SEWERAGE AUTHORITY**

Project Name: _____
Application Number: _____
Pump Station (Y/N): _____
Number of EDU's: _____
Number of Physical Connections: _____
Estimated Construction Cost: _____

1. Application Fee _____ EDU's x \$ 100.00 = _____
2. Preliminary Review¹
Initial Escrow Deposit payable at time of Preliminary Application (\$750 minimum)

Number of Lots _____ Lots x \$200.00 _____
3. Final Review ¹
Deposit payable at time of Final Application (\$750 minimum)

Number of Lots _____ Lots x \$200.00 = _____
4. Construction Inspection Escrow¹
Posted prior to construction, \$750.00 minimum

6% of Estimated Construction Cost _____ Const. Cost x 6.0% = _____

Extraordinary items _____
5. Video Inspection Escrow
Posted prior to Video Inspection.
(Estimate to be provided by ELSA prior to Video
Inspection, if performed by ELSA)

Charges based on \$2,000/crew day _____ Crew Days x \$2,000.00 = _____
6. Connection & Capacity Fee
Payable prior to Certificate of Occupancy

Physical Connection Fee _____ Connections x \$ 100.00 = _____
Capacity Fee _____ EDU's x \$3,096.00 = _____
7. Performance Guarantees² (Posted prior to Construction)
Performance Bond \$ _____ Const. Cost x 110% = _____

Cash \$ _____ Const. Cost x 10% = _____

Total Performance Guarantee = _____
8. Maintenance Guarantee, 2 years³ \$ _____ As-built Cost x 15% = _____

- Notes:
1. Pump Stations, pipe jackings, high water table, rock excavations, severe weather or other extraordinary construction may require additional review fees and inspection escrow.
 2. The itemize construction cost estimate must be appended to the Performance Bond.
 3. As-built construction cost estimate to be provided by ELSA Engineer.

SEWER SYSTEM FEE SCHEDULE FOR SITE PLAN APPLICATIONS

EWING-LAWRENCE SEWERAGE AUTHORITY

Project Name: _____
Application Number: _____
Pump Station (Y/N): _____
Number of EDU's: _____
Number of Physical Connections: _____
Estimated Construction Cost: _____

1. Application Fee _____ EDU's x \$ 100.00 = _____
2. Preliminary Review¹
Initial Escrow Deposit payable at time of Preliminary Application (\$750 minimum)

Building Square Footage
(rounded to next higher 1000 s.f.) _____ 1000 s.f. x \$ 80.00 = _____
3. Final Review¹
Deposit payable at time of Final Application (\$750 minimum)

Building Square Footage
(rounded to next higher 1000 s.f.) _____ 1000 s.f. x \$ 80.00 = _____
4. Construction Inspection Escrow¹
Posted prior to construction, \$1,000.00 minimum

6% of Estimated Construction Cost _____ Const. Cost x 6.0% = _____

Extraordinary items _____
5. Video Inspection Escrow
Posted prior to Video Inspection.
(Estimate to be provided by ELSA prior to Video
Inspection, if performed by ELSA).

Charges based on \$2,000/crew day _____ Crew Days x \$2,000.00 = _____
6. Connection & Capacity Fee
Payable prior to Certificate of Occupancy
Physical Connection Fee _____ Connections x \$ 100.00 = _____

Capacity Fee _____ EDU's x \$3,096.00 = _____
7. Performance Guarantees² (Posted prior to Construction)
Performance Bond \$ _____ Const. Cost x 110% = _____

Cash \$ _____ Const. Cost x 10% = _____

Total Performance Guarantee = _____
8. Maintenance Guarantee, 2 years³ \$ _____ As-built Cost x 15% = _____

Notes: 1. Pump Stations, pipe jackings, high water table, rock excavations, severe weather or other extraordinary construction may require additional review fees and inspection escrow.
2. The itemize construction cost estimate must be appended to the Performance Bond.

3. As-built construction cost estimate to be provided by ELSA Engineer.

**SERVICE CONNECTION APPLICATION
EWING-LAWRENCE SEWERAGE AUTHORITY**

Project Name: _____
Application Number: _____
Pump Station (Y/N): _____
Number of EDU's: _____
Number of Physical Connections: _____
Estimated Construction Cost: _____

Application Fee _____ EDU's x \$ 100.00 = _____

Review Fee
Number of EDU's _____ EDU's x \$ 200.00 = _____

Connection & Capacity Fee
Payable prior to Certificate of Occupancy

Physical Connection Fee _____ Connections x \$ 100.00 = _____

Capacity Fee _____ EDU's x \$3,096.00 = _____

Notes:

1. Service Connection Application to be used only where a service connection to an existing sewer is proposed.
2. Pump stations, siphons or other unusual construction may require additional review and inspection fees.

**TIME EXTENSION REQUEST FEE SCHEDULE APPLICATION
EWING-LAWRENCE SEWERAGE AUTHORITY**

Project Name: _____
Application Number: _____
Pump Station (Y/N): _____
Number of EDU's: _____
Number of Physical Connections: _____
Estimated Construction Cost: _____

Application Fee	\$100.00 per EDU
Payable at time of Application	

Notes:

1. All time extension requests must be approved by Resolution of the Authority.
2. Performance Bond to be adjusted based on current cost estimate.

**SEWER SYSTEM CONSTRUCTION COST ESTIMATE
EWING-LAWRENCE SEWERAGE AUTHORITY (2012)**

Project Name: _____
 Application Number: _____
 Pump Station (Y/N): _____
 Number of EDU's: _____
 Number of Physical Connections: _____
 Estimated Construction Cost: _____

ITEMS	QUANTITY	UNIT	UNIT (\$)	SUBTOTAL (\$)
8" PVC Mainline Sewer		l.f.	75	
10" PVC Mainline Sewer		l.f.	85	
12" PVC Mainline Sewer		l.f.	95	
15" PVC Mainline Sewer		l.f.	105	
18" PVC Mainline Sewer		l.f.	115	
Depth greater than 8'. add		l.f.	20	
Depth greater than 12'. add		l.f.	25	
Sheeting		s.f.	25	
Service Connections		ea.	2,000	
Chimneys		v.l.f.	300	
Pavement Replacement		s.f.	7.50	
4' Manholes (up to 8' deep)		ea.	4,500	
For depths over 8'. add		l.f.	400	
5' Manholes (up to 8' deep)		ea.	6,000	
For depths over 8'. add		l.f.	500	
6 Manholes (up to 8' deep)		ea.	7,500	
For depths over 8'. add		l.f.	700	
For depths over 12'. add		l.f.	1,200	
Connections to existing M.H.		ea.	2,000	
Lawn Restoration (Sod)		1000 s.f.	1,200	
Shop Drawing Review		l.f.	5.00	
Testing		l.f.	8.00	
As-Built Documents		l.f.	4.00	
Pump Station (2)				
Force Main (2)				
Other				
TOTAL (\$)				

Notes:

- (1) To be determined as required.

Q. LOTS INCLUDED IN SEWER SERVICE AREA

Only projects within the Mercer County Draft Wastewater Management Plan Service Area for Ewing and Lawrence or Hopewell Township are eligible to receive sewer service from the Ewing-Lawrence Sewerage Authority. To receive sewer service from ELSA, properties in Hopewell Township must be in the Hopewell Wastewater Management Plan and have a formal approval and service agreement with ELSA. The Wastewater Management Plan Maps may be found on the Mercer County website <http://nj.gov/counties/mercerc/departments/planning/wastewater.html>. Once there click on "Future Wastewater Service Area".

R. STANDARD DETAILS

Amended July 2015