RULES & REGULATIONS
GOVERNING APPLICATION FOR WATER OR SEWER SERVICE WITHIN THE AUTHORITY'S SERVICE AREA

for the

LTMUA

THE LAKEWOOD TOWNSHIP MUNICIPAL UTILITIES AUTHORITY

AUGUST 1991

Prepared by

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Addendum No. 1 Summary

REVISIONS TO THE LTMUA RULES & REGULATIONS

1. **RESOLUTION NO. 94-22**
Revised August 15, 1994

To reflect the hiring of a full-time in-house engineer the Authority adopted Resolution number 94-22 which amends the definitions of the following:

Section 1.12.2 – Subsections (f), (g), (h) and (i)

(f) Engineer: The Authority Engineer employed directly by the Authority or a consulting firm appointed by the Authority to represent the Authority.
(g) Engineering Fees: The fees calculated by the multiplying the number of hours spent by the engineer by the hourly fee as stipulated on the Engineering Fee Schedule adopted by the Authority.
(h) Attorney's Fees: The fees for the attorney's services calculated by multiplying the number of hours spent by the attorney by the hourly fees as stipulated on the Attorney's Fee Schedule adopted by the Authority.
(i) Review Fees: Any fees or expenses for a project which will include but not be limited to engineering fees, attorney fees, construction observation fees, laboratory analysis or consultant's fee.

1. **Section 3 – 3.04 GENERAL REQUIREMENTS FOR WATER LATERAL**
Materials for Water Laterals
Revised December 19, 1994

Add to this Section:

5. Back Flow preventers – All fire service lines shall have back flow preventers installed. They shall be reduced pressure type back flow preventers approved by the Authority engineer.

Section 5 – 5.03 – VALVES
Back Flow Prevention Valves

This entire section to be removed and replaced with the following – italics

All back flow prevention valves shall be the reduced pressure type.

2. **RULE**
Revised December 3, 1996

Every application for approval that includes or should include the abandonment of existing structures, including but not limited to reservoirs, basins, dams, canals, aqueducts, standpipes, conduits, pipelines, mains, pumping and ventilating stations,

treatment, purification and filtration plants or works, trunk, intercepting and outlet sewers, water distribution systems, waterworks, wells, and their appurtenances, shall include:

a.) An abandonment plan adhering to sound engineering principles that will reasonably protect the integrity of the operative water and sewer systems and the safety of the public; and

b.) Performance guarantees to secure completion of the abandonment plan within a set time. The amount of the guarantee and the time for completion shall be determined by the Authority engineer.

3. MANHOLES, MANHOLE COATINGS. CAULKING MATERIALS
Revised March 6, 2001

- **Manholes** - We recommend that the regulations be revised to allow only "Wet Cast" Manholes be accepted. This is a more watertight construction.
- **Manhole Coatings** – We recommend that the regulations be revised to allow the use of any epoxy paint instead of the Coal Tar epoxy paint as originally specified. The coal tar paint is more toxic and although it is a better product, with the use of the wet cast manholes we feel that the standard epoxy paint will be acceptable.
- **Caulking Materials** – We are recommending that the regulations be revised to require that contractors use Sikaflex-2C to fill in the area between the pipe and the Manhole wall instead of non-shrink grout. This will allow greater flexibility between the pipe and the manhole to prevent a shear failure should settlement occur.

4. MANHOLE STEPS, CLEANOUT CASTINGS & CLEANOUT LOCATORS
Revised April 3, 2001

a. **Manhole steps** – We recommend that the regulations be revised to eliminate the reference to cast iron steps. They have never been used on any of the Authority's projects and our discussions with other professionals indicate that they are not used in most areas.

b. **Cleanout Castings** – We recommend that the regulations be revised to require the use of a cast iron casting for the first cleanout on a lateral and any cleanout that is to be owned by the Authority. This requirement provides protection for the cleanout and allows the use of a metal detector to locate the cleanout.

c. **Cleanout Locators** – We recommend that the regulations be revised to require the use of a steel bar to be buried adjacent to any cleanout that does not have a cast iron casting. This requirement allows the use of a metal detector to locate the cleanout.

Addendum No. 2 Summary

REVISIONS TO THE LTMUA RULES & REGULATIONS

1. **Section 2.05.06 Performance Guarantee Release & Acceptance for Ownership**
By Motion, Meeting of March 5, 2002

Add to this Section:

(5) As-built Drawings. The applicant's engineer will be required to provide the Authority with two prints of the as-built drawing for review by the Authority's engineer. Upon acceptance of the drawings by the Authority, the applicant's engineer will be required to provide the Authority the as-built drawing in a digital format that is compatible with the Authority's current mapping. The Authority will then have this information added to the Authority's current mapping. If the applicant's engineer cannot provide the mapping in a digital format that is compatible with the Authority's current mapping, the Authority will either transfer the information to the Authority's current mapping or have a consulting firm transfer the information to them.

In all instances, all costs associated with the review of the drawings and the modifications of the Authority's mapping will be borne by the applicant.

2. **Section 5 – MATERIALS FOR WATER SUPPLY**
By Motion, Meeting of March 5, 2002

Add to this Section:

5.17 Materials Required for Lines Adjacent to Underground Fuel Storage Tanks.

This specification will be required to be used for all water mains that are installed on or within one hundred and fifty feet of a property to be used as a service station used for the purpose of dispensing fuel. It will also govern any main located within one hundred and fifty feet of a known underground fuel storage tank. For these areas the Authority requires the use of Mechanical Joint Pipe, Valves and fittings with Nitrile Gaskets. The pipe must meet all other criteria listed section 5.01.2 of these regulations.

In all instances where the site is known to be contaminated, the Authority will require that all of the above criteria be employed with the substitution of Viton Gaskets for the Nitrile Gaskets. In this case it will also be required that the line be protected with a polyethylene wrapping and be surrounded for a distance of at least 24 inches on all sides with clean imported material meeting the classification of ML or CL.

Addendum No. 3

LAKEWOOD TOWNSHIP MUNICIPAL UTILITIES AUTHORITY
WATER RATE SCHEDULE

1. **Section 4 – Water Connection Fees and Charges**
   By Motion, Meeting of July 5, 2005

   Add to Item #3 of this Section.

   The connection fee for an application received for a multiple tenant commercial building is to be calculated based on the number of units that the building could be divided into even if the building has only one water meter. If a building is constructed so that it can be divided into more than one unit, the connection fee will be calculated based on the maximum number of units that it can be divided into even if some of the units are combined so that more than one unit is used by a single tenant when the building is first occupied.

   If an existing multiple tenant building adds additional units onto the building, the owner will be charged a water connection fee for each unit added to the building except in the Industrial Campus where water connection fees are waived.

   If an existing multiple tenant commercial or industrial building is changed from a single water meter to multiple water meters and we have no record of exactly how much of a connection fee was paid, the following procedure to calculate the water connection fee is to be used. Calculate the connection fee for each unit, or potential unit, in the building using the same procedure as described above for new construction of this type of building. Credit the applicants review fee account an amount equal to the maximum amount for a water connection fee that would have been charged for a single building at the time the building was constructed. Prepare separate applications for service for each of the units that will now be billed directly by the Authority. The fees listed on the application for service for this modification will include the cost of the meter, deposits for water and the connection fee associated with each unit. In the Industrial Park there is a connection fee for water, in the Industrial Campus there is no connection fee for water. At the end of the project, any unused funds in the escrow account are to be returned.

Addendum No. 4

LAKEWOOD TOWNSHIP MUNICIPAL UTILITIES AUTHORITY
SEWER RATE SCHEDULE

1. **Rate Schedule No.4 Connection Fees and Charges - Section for Character of Connection**
   By Motion, Meeting of July 5, 2005

   Add to Item #4 of this Section.

   The connection fee for an application received for a multiple tenant commercial building is to be calculated based on the number of units that the building could be divided into even if the building has only one water meter. If a building is constructed so that it can be divided into more than one unit, the connection fee will be calculated based on the maximum number of units that it can be divided into even if some of the units are combined so that more than one unit is used by a single tenant when the building is first occupied.

   If an existing multiple tenant building adds additional units onto the building, the owner will be charged a sewer connection fee for each unit added to the building except in the Industrial Park where sewer connection fees are waived.

   If an existing multiple tenant commercial or industrial building is changed from a single water meter to multiple water meters and we have no record of exactly how much of a connection fee was paid, the following procedure to calculate the sewer connection fee is to be used. Calculate the connection fee for each unit, or potential unit, in the building using the same procedure as described above for new construction of this type of building. Credit the applicants review fee account an amount equal to the maximum amount for a sewer connection fee that would have been charged for a single building at the time the building was constructed. Prepare separate applications for service for each of the units that will now be billed directly by the Authority. The fees listed on the application for service for this modification will include the cost of the meter, deposits for sewer and the connection fee associated with each unit. In the Industrial Park there is no connection fee for sewer, in the Industrial Campus there is a connection fee for sewer. At the end of the project, any unused funds in the escrow account are to be returned.

Addendum No. 5 Summary

REVISIONS TO THE LTMUA RULES & REGULATIONS

1. **Section 5.14 Corporation Stop**
   By Motion, Meeting of July 5, 2005

   Remove the first sentence of Section 5.14 and replace with the following:

   Corporation stop shall be either Mueller H-15000 or McDonald 4701BQ, copper service flared end connection outlet for copper service tubing or approved equal.

2. **Section 5.15 Curb Stop**
   By Motion, Meeting of July 5, 2005

   Remove the first sentence of Section 5.15 and replace with the following:

   Curb stop shall be Mueller H-15204 Mark III Oriseal Valve or McDonald 6100Q.

3. **Section 5.16 Curb Box**
   By Motion, Meeting of July 5, 2005

   Remove Section 5.16 and replace with the following:

   Curb box for a 1" service connection shall be either a Mueller H-10314 with Mueller 89982 lid or McDonald 5601.

   Curb box for a 1½" service connection shall be either a Mueller H-10314 with Mueller 89982 lid or McDonald 5601 and McDonald 5700 enlarged base.

   Curb box for a 2" service connection shall be either a Mueller H-10310 with Mueller 89981 lid or McDonald 5601 and McDonald 5700 enlarged base.

4. **Section 5.07 Fire Hydrants**
   By Motion, Meeting of July 5, 2005

   Add to this section.

   Any fire hydrant that must be relocated due to interference caused by a developer must be removed and replaced with a new fire hydrant. The isolation valve will be closed and a cap installed. The cap must be rodded back to the tee. The rods are to be coated with coal tar epoxy. A wet tap and a valve will be installed in the new location and new pipe and a new hydrant installed. The valve shall be rodded to the hydrant and the rods coated with coal tar epoxy.

Addendum No. 5 Summary

REVISIONS TO THE LTMUA RULES & REGULATIONS
Continued

5. **Section 7.19 As-Built Information**
   By Motion, Meeting of July 5, 2005

   Add to this Section after the first sentence.

   As-built drawings are to include all items as detailed in the LTMUA As-Built Requirement Schedule or any other items deemed necessary by the Authority's Engineer during the review of the drawings.

Addendum No. 6 Summary

REVISIONS TO THE LTMUA RULES & REGULATIONS

1. **Section 7.19 As-Built Information**
   By Motion, Meeting of June 2, 2006

   Add to this Section:

   The Authority requires that as-built drawings for developments are due in two phases:

   - preliminary phase and
   - final phase.

   The **preliminary as-built drawings** are due to the Authority's Engineer 30 days after the sanitary sewer main is installed. These as-built drawings are to include the plan and profile of the sanitary sewer main. All lengths and slopes of the pipe must be shown. All manhole rim and invert elevations must be shown.

   It is also a requirement of the Authority, that under no circumstance can anyone occupy any unit until the Authority receives certified preliminary as-built drawings from the developer and that the as-built drawings are acceptable to the Authority's engineer.

   If the preliminary as-built drawings are not received by the Authority within 30-days upon installation of the sanitary sewer main, a letter will be sent to the developer informing the developer that he has 30-days to submit as-built plans or a penalty of $100 per day for each day the as-built drawings are not received will be imposed.

   The **final as-built drawings** are due 30-days upon completion of the project. All landscaping must be installed. These as-built drawings must be in strict compliance with the As-built Drawing Checklist of Requirements. The Authority Engineer will issue a letter to the Developer when it is felt that the project is significantly complete to allow the preparation of as-built drawings. The Developer will have 90 days to complete the final phase of the as-built drawings. If the Final as-built drawings are not submitted that meet all of the as-built drawing checklist requirements within 90-days, a penalty of $100.00 per day will be assessed for each day beyond that date until satisfactory drawings are received, reviewed and approved.

   The as-built drawings are to include all items outlined on the as-built drawing checklist as well as the following:

   - the relationship between the water and sewer mains to all curb lines
   - all dimensions of separation between any crossing of any other utilities or structures such as retaining walls must be given and it must be noted if concrete cradles or Styrofoam were installed

   If all houses have not been constructed, the Authority Engineer may require that the final as-built drawing be updated when all houses are completed. Swing ties in either case are required to each curb stop and cleanout installed.

   The Authority will have 10 working days to review and respond to as-built drawing submissions. This will be charged against the daily requirement. Any review time beyond the 10-day review period will be added to the time period.

Addendum No. 7
REVISIONS TO THE LTMUA RULES & REGULATIONS
Resolution No. 08-42 by motion, meeting of August 5, 2008

1) Add after first paragraph in section 7.19 AS-BUILT INFORMATION:

It is the responsibility of the developer to provide to the Authority's Engineer one drawing set for the Preliminary Sanitary Sewer System As-Built. This is due to the Authority's Engineer no later than thirty (30) days after substantial completion of the sanitary sewer system. The requirements for Preliminary Sanitary Sewer System As-Built drawings are attached to and made part of the Rules and Regulations.

It is the responsibility of the developer to provide to the Authority's Engineer one drawings set for the Preliminary Water Distribution System As-Built. This is due to the Authority's Engineer no later than thirty (30) days after substantial completion of the water distribution system. The requirements for Preliminary Water Distribution System As-Built drawings are attached to and made part of the Rules and Regulations.

If the developer does not provide approved drawings to the Authority's Engineer within sixty (60) days of final completion, the Authority has the right to remove one-hundred dollars ($100) per day from the project escrow account as a penalty for each day past that date that the plans have not been submitted reviewed and approved. If the account is in arrears, it is the responsibility of the developer to replenish the account.

If within sixty (60) days of final completion, the Authority's Engineer does not possess approved As-built drawings, the Authority may contact the bonding agency to have the As-built drawings completed. The requirements for final Sanitary Sewer System and Water Distribution System As-Built drawings are attached to and made part of the Rules and Regulations.

2) Add a new item in 3.04 GENERAL REQUIREMENTS FOR WATER LATERAL after #5 for Materials for Water Lines :

Detection Tape – All water lines shall have detection tape installed 24-inches below grade parallel to the line. The tape shall be located along the water mains and laterals up to the curb stop. Detection tape shall be Terra Tape® Sentry Line ® Detectable, Part No. 42-0074, Color: Blue, Dimensions: 6"x1000', Word Imprint: "WATER LINE". Supplier: Reef Industries, 9209 Almeda Genoa Rd, Houston, Texas 77075, Phone: 1.800.231.6074

3) Add a new item in 3.05 GENERAL REQUIREMENTS FOR SEWER LATERALS after #4 for Material for Sewer Laterals :

Detection Tape – All sanitary laterals and sewer mains not located in pavement shall have detection tape installed 24-inches below grade parallel to the line. The tape shall be located from the sanitary main to the first clean-out. Detection tape shall be Terra Tape® Sentry Line ® Detectable, Part No. 42-0117, Color: Green, Dimensions: 6"x1000', Word Imprint: "SEWER LINE". Supplier: Reef Industries, 9209 Almeda Genoa Rd, Houston, Texas 77075, Phone: 1.800.231.6074

4) Insert after new section after 7.14 PIPE ENCASEMENT

7.1# PIPE CRADLE

Concrete Cradles. The utility shall be supported by concrete cradle wherever shown on the plans or as directed by the Authority Engineer. All concrete cradles shall be reinforced in accordance with the Standard Cradle Detail and shall be of sufficient length as to span the condition encountered.

5) Substitute section below as a revision for section 3.09.2 PROFILES

Separation of Utilities. At crossings all utilities should be separated by at least 18 inches. If the 18" separation is impossible to maintain then the utilities will be protected in accordance to the following schedule:

1. Water main over sanitary sewer, 9"-18"
   Water main DIP/with concrete cradle, 10' each side
   Sanitary sewer PVC/or DIP

2. Water main over sanitary sewer, 2"-9"
Water main DIP/with concrete saddle
Sanitary sewer DIP.

3. Sanitary sewer over water main, 9"-18"
Water main MJDIP, 20' each side of crossing
Sanitary sewer MJDIP /with concrete saddle

4. Sanitary sewer over water main, 2"-9"
Sanitary sewer MJDIP/concrete cradle, 5' each side
Water Main MJDIP, 20' each side of crossing

5. Storm sewer over sanitary sewer, 9"-18"
Storm sewer/with concrete cradle, 10' each side
Sanitary sewer/ PVC or DIP, manhole to manhole

6. Storm sewer over sanitary sewer, 2"-9"
Storm sewer/with concrete cradle, 10' each side of sanitary sewer
Sanitary sewer DIP, manhole to manhole

6) In section 5.08 VAULTS AND MANHOLES insert after "LTMUA WATER":

and year manhole was installed

7) In section 6.03 MANHOLES insert after LTMUA:

and year manhole was installed

8) Insert a new subsection in 2.0 APPLICATION FOR SERVICE

2.0# PHASE 1 ENVIRONMENTAL ASSESSMENT

Submission Requirements.

(1) Application, type written or neatly printed.
(2) Fees, in accordance with the Fee Schedule.

If the Authority receives a letter requesting information of a property under Phase 1 Environmental Assessment, the Executive Director shall examine the project to determine if it is feasible to access the requested information. If the Executive Director has technical questions or if he feels the project requires technical review he may request a review of the project by the Authority's Engineer. All review fees incurred by the Authority will be paid for by the Applicant. Information that is reasonably feasible to access shall be in reference to projects that have been completed within the past three (3) years from the date of the application.

If the Authority finds that the information cannot be feasibly accessed, and the Applicant still requests the Authority to investigate further, the Applicant shall be required to open an Escrow Account and the project will be subject to verification by the Authority Engineer. The Authority Engineer will provide to the Authority its findings. If no information can be obtained and verified, the Authority Engineer will provide this information to the Authority and a letter will be issued to the Applicant. This letter must be reviewed and approved by the Authority's attorney.

9) Insert a new subsection in 4.02 AMOUNTS OF FEES AND GUARANTEES

4.02.# PHASE 1 ENVIRONMENTAL ASSESSMENT

Application Fee	$ 500.00
Project Review Fee (Escrow)	$ 500.00

Addendum No. 8 Summary

REVISIONS TO THE LTMUA RULES & REGULATIONS

1. **Section 3.07 INDIVIDUAL COMMERCIAL/INDUSTRIAL CONNECTIONS**
   By Motion, Meeting of August 2, 2011

   Add to the end of this Section:

   Horizontal Datum. Drawings must be in the North American Datum (NAD) of 1983. Upon approval of the application an electronic copy of the drawing must be provided to the Authority in AutoCad (.dwg) format. The electronic drawing must be in NAD of 1983.

   Vertical Datum. Drawings with elevations must be based on the North American Vertical Datum (NAVD) of 1988. The location and elevation of the nearest benchmark must be indicated in the general notes on the sheet providing the water and sanitary sewer information. The design engineer must establish adequate benchmarks for the area to assist the contractor in verifying grades. Any facility whose depth is not known should be clearly indicated and a note added indicating "The Contractor shall expose prior to construction and verify the elevation of these facilities." If in the judgement of the Authority Engineer requiring the applicant to provide drawings in the NAVD of 1988 places a hardship on the applicant, the Authority Engineer may accept the drawings based on the National Geodetic Vertical Datum (NGVD) of 1929 provided a conversion factor to the NAVD of 1988 is noted on the drawings.

2. **Section 3.09.1 CONSTRUCTION PLANS**
   By Motion, Meeting of August 2, 2011

   Add to the beginning of this Section:

   Horizontal Datum. Drawings must be in the North American Datum (NAD) of 1983. Upon approval of the construction drawings an electronic copy of the drawing must be provided to the Authority in AutoCad (.dwg) format. The electronic drawing must be in NAD of 1983.

   Vertical Datum. Drawings with elevations must be based on the North American Vertical Datum (NAVD) of 1988. The location and elevation of the nearest benchmark must be indicated in the general notes on the sheet providing the water and sanitary sewer information. The design engineer must establish adequate benchmarks for the area to assist the contractor in verifying grades. All utilities which cross the proposed facilities must be shown on the profile and their elevation given. Any facility whose depth is not known should be clearly indicated and a note added indicating "The Contractor shall expose prior to construction and verify the elevation of these facilities." If in the judgement of the Authority Engineer requiring the applicant to provide drawings in the NAVD of 1988 places a hardship on the applicant, the Authority Engineer may accept the drawings based on the National Geodetic Vertical Datum (NGVD) of 1929 provided a conversion factor to the NAVD of 1988 is noted on the drawings.

3. **Section 3.09.2 PROFILES**
   By Motion, Meeting of August 2, 2011

   Remove the following portion of this Section:

   General. All elevations must be based on NGVD. The location and elevation of the nearest benchmark must be indicated in the General Notes for each sheet. The Design Engineer must establish adequate benchmarks for the area to assist the Contractor in verifying grades. All utilities which cross the proposed facilities must be shown on the profile and their elevation given. Any facility whose depth is not known should be clearly indicated and a note added indicating, "The Contractor shall expose prior to construction and verify the elevation of these facilities".

   Add the following to the beginning of this Section:

Vertical Datum. Drawings with elevations must be based on the North American Vertical Datum (NAVD) of 1988. The location and elevation of the nearest benchmark must be indicated in the general notes on the sheet providing the water and sanitary sewer information. The design engineer must establish adequate benchmarks for the area to assist the contractor in verifying grades. All utilities which cross the proposed facilities must be shown on the profile and their elevation given. Any facility whose depth is not known should be clearly indicated and a note added indicating "The Contractor shall expose prior to construction and verify the elevation of these facilities." If in the judgement of the Authority Engineer requiring the applicant to provide drawings in the NAVD of 1988 places a hardship on the applicant, the Authority Engineer may accept the drawings based on the National Geodetic Vertical Datum (NGVD) of 1929 provided a conversion factor to the NAVD of 1988 is noted on the drawings.

Addendum No. 9 Summary
REVISIONS TO THE LTMUA RULES & REGULATIONS

The following sections are to be revised as follows:

3.04 GENERAL REQUIREMENTS FOR WATER LATERAL & WATER MAINS

(1) All water laterals must be 5' below the ground surface.

(2) Connection to the Authority's system must be made by "wet" tapping the line unless special provisions are made. All horizontal and vertical fittings must be securely restrained.

(3) The minimum size of any water lateral to the Authority's system is 1" from the main to the curb box. The service can be less than this on the applicant's property with the approval of the Building Department.

Materials for Water Lines

(a) Tapping Sleeve. All sleeves should be a Mueller Mechanical Joint. Split sleeve type tapping sleeve or approved equal. The Authority will also allow stainless steel tapping sleeves with stainless nuts and bolts as constructed by JCM, Inc.

(b) Ductile Iron Pipe. All water mains 4" or larger must be cement lined Ductile Iron Pipe with a minimum wall thickness of Class 52 and shall conform to ANSI A21.51-1976 (AWWA C151) or latest revision. Pipe exterior must have Standard Foundry Coal Tar Epoxy coating.

(c) Copper Water Lines. All services 2 inches or less must be Type K soft temper, conforming with the requirements of ASTM Specifications B88. Fittings shall be flared or compression fittings approved by the Authority.

(d) Ductile Iron Fittings. All ductile iron fittings shall be cement lined Mechanical Joint meeting the requirements of ANSI/AWWA C110-77. Mechanical Joints shall conform to ASA 21.11. Cement lining shall conform to ASA 21.4 and shall include a bituminous seal coat. The exterior of all fillings must have a Standard Foundry Coal Tar Dip Coating.

(e) Back Flow Preventers. All fire service lines shall have back flow preventers installed. They shall be reduced pressure type back flow preventers approved by the Authority Engineer.

(f) Detection Tape – All water lines shall have detection tape installed 24-inches below grade parallel to the line. The tape shall be located along the water mains and laterals up to the curb stop. Detection tape shall be Terra Tape® Sentry Line ® Detectable, Part No. 42-0074, Color: Blue, Dimensions: 6"x1000', Word Imprint: "WATER LINE". Supplier: Reef Industries, 9209 Almeda Genoa Rd, Houston, Texas 77075, Phone: 1.800.231.6074.

3.05 GENERAL REQUIREMENTS FOR SEWER LATERALS & SEWER MAINS

(1) Sewer laterals should be connected to existing lateral stubs wherever possible.

(2) Connections of sewer laterals to existing manholes should be avoided. If necessary, however, the connection to the existing manhole must be made by coring the existing manhole in accordance with the Detail for Connection to Existing Manhole. Internal drop connection must meet all the requirements as indicated on the Internal Drop Connection Detail. Explicit details of this

connection must be made on the plans to allow the reviewer to determine if this internal drop will interfere with access within the manhole.

(3) Connections of laterals to existing sanitary sewer pipe must be made by coring the existing sanitary sewer pipe and installing a saddle. The saddle must be a double stainless steel strap saddle. Care will be taken not to over tighten the straps thus damaging the Authority's lines.

Materials for Sewer Lines

(a) Poly Vinyl Chloride (PVC). Sewer pipe for laterals shall, as a minimum, conform to ASTM D-1785, Schedule 40, "Type PSM Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings". Sewer pipe for sanitary mains shall conform to the following table:

Material	Depth	With Deep House Service Connections
SDR-35	**< 12'**	**N/A**
SDR-35	**12'-16'**	**No**
C-900	**12'-16'**	**Yes**
C-900	**> 16'**	**Yes or No**

SDR-35 sewer pipe for main sanitary sewer lines shall, at a minimum, conform to ASTM D-3034, DR 35. Joints shall be integral bell, Bell and Spigot type rubber gasket joint. Bell shall be integral complete with single rubber gasket conforming to ASTM D-3212. C-900 sewer pipe for sanitary sewer lines shall, at a minimum conform to the AWWA C-900 specification with a pressure class of 235 psi (DR 18). Gaskets must meet ASTM F477 and joints must be in compliance with ASTM D3139.

(b) Ductile Iron Pipe. Sewer pipe for laterals or mains shall conform to ASA Specifications A21.51 minimum thickness Class 52. Ductile Iron pipe must be epoxy coated with Induron's Protecto 401 Ceramic Epoxy or an equivalent approved by the Authority Engineer. Joints shall conform with ASA Specification A21.11 with single elongated grooved gasket similar to United States Cast Iron Pipe companies "Tyton" Joint or equal. Gaskets shall be of a composition suitable for exposure to sewage.

(c) Other Pipe Materials. No other materials will be permitted for sanitary sewer mains or laterals unless specifically approved by the Authority Engineer.

(d) Fittings. All fittings, plugs, adapters, wye tees, wyes or other fittings must be the same material as the pipe unless alternate materials are approved by the Authority's Engineer.

(e) Markings. All pipe and fittings shall be clearly marked on the outside surface with trade name, pipe size and class designation.

(f) Detection Tape – All sanitary laterals and sewer mains not located in pavement shall have detection tape installed 24-inches below grade parallel to the line. The tape shall be located from the sanitary main to the first clean-out. Detection tape shall be Terra Tape® Sentry Line ® Detectable, Part No. 42-0117, Color: Green, Dimensions: 6"x1000', Word Imprint: "SEWER LINE". Supplier: Reef Industries, 9209 Almeda Genoa Rd, Houston, Texas 77075, Phone: 1.800.231.6074.

Addendum No. 10 Summary
REVISIONS TO THE LTMUA RULES & REGULATIONS

The following sections are to be revised as follows:

3.04 GENERAL REQUIREMENTS FOR WATER LATERAL & WATER MAINS

(1) All water laterals must be 5' below the ground surface.

(2) Connection to the Authority's system must be made by "wet" tapping the line unless special provisions are made. All horizontal and vertical fittings must be securely restrained.

(3) The minimum size of any water lateral to the Authority's system is 1" from the main to the curb box. The service can be less than this on the applicant's property with the approval of the Building Department.

Materials for Water Lines

(a) Tapping Sleeve. All sleeves should be a Mueller Mechanical Joint. Split sleeve type tapping sleeve or approved equal. The Authority will also allow stainless steel tapping sleeves with stainless nuts and bolts as constructed by JCM, Inc.

(b) Ductile Iron Pipe. All water mains 4" or larger with the exception of scenarios that directional drilling construction procedures are being utilized must be cement lined Ductile Iron Pipe with a minimum wall thickness of Class 52 and shall conform to ANSI A21.51-1976 (AWWA C151) or latest revision. Pipe exterior must have Standard Foundry Coal Tar Epoxy coating.

(c) High Density Polyethylene. All water mains 3" or larger when construction scenarios require directional drilling procedures must be fusible High Density Polyethylene PE 4710 DR 9 as classified by ASTM D3350 "Standard Specification for Polyethylene Plastics Pipe and Fittings Materials" with pressure class as described in AWWA C901-08. The maximum depth to be used for HDPE pipe is 25'. For depths greater than 25' burial depth calculations per the Plastic Pipe Institutes (PPI) Handbook certified by a Professional Engineer (PE) in the state of New Jersey must be provided to the Authority for approval.

(d) Copper Water Lines. All services 2 inches or less must be Type K soft temper, conforming with the requirements of ASTM Specifications B88. Fittings shall be flared or compression fittings approved by the Authority.

(e) Ductile Iron Fittings. All ductile iron fittings shall be cement lined Mechanical Joint meeting the requirements of ANSI/AWWA C110-77. Mechanical Joints shall conform to ASA 21.11. Cement lining shall conform to ASA 21.4 and shall include a bituminous seal coat. The exterior of all fillings must have a Standard Foundry Coal Tar Dip Coating.

(f) Back Flow Preventers. All fire service lines shall have back flow preventers installed. They shall be reduced pressure type back flow preventers approved by the Authority Engineer.

(g) Detection Tape – All water lines shall have detection tape installed 24-inches below grade parallel to the line. The tape shall be located along the water mains and laterals up to the curb stop. Detection tape shall be Terra Tape® Sentry Line ® Detectable, Part No. 42-0074, Color: Blue, Dimensions: 6"x1000', Word

Imprint: "WATER LINE". Supplier: Reef Industries, 9209 Almeda Genoa Rd, Houston, Texas 77075, Phone: 1.800.231.6074.

5.01.6 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

HDPE water mains are only permitted in directional drilling construction. All HDPE pipe must be fusible PE 5710 DR 9 as classified by ASTM D3350 "Standard Specification for Polyethylene Plastics Pipe and Fittings Materials".

Size of Pipe – This specification shall cover all sizes of HDPE pipe. Only 3" – 24" pipe sizes will be permitted in the system without specific approval by the Authority.

Joint Type – Pipe will be fused using "butt-fusion" procedures that follow manufacturer's instructions and recommendations and meet or exceed ASTM F2620 "Pipe – Design and Installation" standards.

Pressure Class – Pipe shall meet pressure class as described in AWWA C901-08 for PE 4710 DR 9 pipe.

Storage – Pipe shall be stored and protected from sunlight and the elements. Sunburnt or weather worn pipe shall be rejected.

7.12.7 ASSEMBLY OF PIPE AND FITTINGS

Mechanical Joint. Mechanical joints shall be carefully assembled in accordance with the manufacturer's recommendations. If effective sealing is not obtained, the joint shall be disassembled, thoroughly cleaned and reassembled. Over tightening bolts to compensate for poor installation practices will not be permitted.

The holes in mechanical joints with tie rods shall be carefully aligned to permit installation of the tie rods. The Authority allows the use of Super Star Tie Bolts as manufactured by Star National Products, to assist in the rodding of mechanical joint fittings where required. In flange and mechanical joint pieces, holes in the mechanical joint bells and the flanges shall straddle the top (or side for vertical piping) centerline. The top (or side) centerline shall be marked on each flange and mechanical joint piece by the manufacturer.

Push-On-Joint. The pipe manufacturer's instructions and recommendations for proper jointing operations shall be followed. All joint surfaces shall be lubricated with heavy vegetable soap solution immediately before the joint is completed. Lubricant shall be suitable for use in potable water as recommended by the pipe manufacturer, shall be stored in closed containers and shall be kept clean. Each spigot end shall be suitable beveled to facilitate assembly. If the lubricant becomes contaminated with any foreign material the Contractor will immediately discard the contaminated lubricant.

Butt-Fusion and Directional Drilling HDPE. The pipe manufacturer's instructions and recommendations for standardized butt-fusion of HDPE pipe for directionally drilled pipe shall be followed. The butt-fusion procedures must meet or exceed ASTM F2620 "Pipe – Design and Installation" standards. Contractor must be certified by the particular horizontal directional drilling manufacturer that the Contractor is a fully trained user of the directional drilling equipment. Evidence of the certification must be provided to the Authority at time of shop drawing submission. The HDPE pipe jointing shall be performed by personnel trained in the use of butt-fusion equipment and recommended methods for new pipe

connections. Evidence of the training must be provided to the Authority at time of shop drawing submission.

7.16.2 WATER

Preliminary Bacteriological Tests. Prior to the hydrostatic pressure test occurring on newly installed water main water samples must be tested in accordance with Section 7.21.3 of these regulations.

7.21.3 BACTERIOLOGICAL TESTS

Standard Conditions. Prior to the hydrostatic pressure test occurring and after final flushing and before the water main is placed in service, a sample or samples witnessed by a representative of the Authority shall be collected from the end of the line, shall be tested for bacteriological quality in accordance with NJAC 7:10-11.6(d). At least one sample shall be collected from the new main and one from each branch. In case of extremely long mains, it is desirable that samples be collected along the length of the line at least every one thousand two hundred (1,200) feet as described in AWWA Standard C651-05 as well as at its end.

Addendum No. 12 Summary
REVISIONS TO THE LTMUA RULES & REGULATIONS

The following sections are to be revised as follows:

1. Revised Title to "Deep Service Connection" to be "Deep Service Connection 4 inch"
2. Created a new detail entitled "Deep Service Connection 6 inch"
3. Renumbered "Bedding Detail" so the two deep service connection details could fall next to each other.

Addendum No. 13 Summary
REVISIONS TO THE LTMUA RULES & REGULATIONS

The following sections are to be revised as follows:

5.17 TRACER WIRE FOR OPEN-TRENCH/OPEN CUT CONSTRUCTION

Tracer wire must be installed above all water mains and water services. Tracer wire must be high strength copper clad steel (CCS) with a minimum rated break load of 400 lbs (Pro-Trace HF-CCS PE30 10 AWG, Copperhead High Strength 1230 12 AWG or equivalent as determined by the Authority Engineer). The tracer wire jacket must be high density polyethylene (HDPE) or High Molecular Weight Polyethylene (HMWPE).

At all connector/splice locations a moisture displacement connector must be used (Copperhead SnakeBite, 3M DBR or equivalent as determined by the Authority Engineer).

Test stations must be installed at every residential home and commercial building. Test stations must be a water proof electrical box (PVC) located a minimum 18"-24" above the ground and located within 5' of the touchpad for the water meter. Tracer wire must be brought to the test station via ¾" schedule 80 PVC conduit from the ground to the box.

5.18 TRACER WIRE FOR DIRECTIONAL DRILLING OR PIPE BURSTING CONSTRUCTION

Tracer wire must be installed above all water mains and water services. Type of tracer wire will be submitted to the Authority for approval at the time of shop drawing review. Tracer wire for directional drilling and pipe bursting construction will be approved by the Authority Engineer on a case by case basis.

6.06 TRACER WIRE FOR OPEN-TRENCH/OPEN CUT CONSTRUCTION

Tracer wire must be installed above all sanitary sewer mains and sanitary sewer services. Tracer wire must be high strength copper clad steel (CCS) with a minimum rated break load of 400 lbs (Pro-Trace HF-CCS PE30 10 AWG, Copperhead High Strength 1230 12 AWG or equivalent as determined by the Authority Engineer). The tracer wire jacket must be high density polyethylene (HDPE) or High Molecular Weight Polyethylene (HMWPE).

At all connector/splice locations a moisture displacement connector must be used (Copperhead SnakeBite, 3M DBR or equivalent as determined by the Authority Engineer).

Test stations must be installed at every residential home and commercial building. Test stations must be a water proof electrical box (PVC) located a minimum 18"-24" above the ground and located within 5' of the touchpad for the water meter. Tracer wire must be brought to the test station via ¾" schedule 80 PVC conduit from the ground to the box.

6.07 TRACER WIRE FOR DIRECTIONAL DRILLING, JACK & BORE OR PIPE BURSTING CONSTRUCTION

Tracer wire must be installed above all sanitary sewer mains and sanitary sewer services. Type of tracer wire will be submitted to the Authority for approval at the time of shop drawing review. Tracer wire for directional drilling, jack & bore and pipe bursting construction will be approved by the Authority Engineer on a case by case basis.

7.12.1 ALIGNMENT AND GRADE

Paragraph 1 – No Change

Paragraph 2 – No Change

After 2nd Paragraph add the following paragraph:

Detection tape with aluminum core and copper clad steel tracer wire must be installed above all water and sanitary sewer lines. Detection tape must be located 1 foot below final grade and tracer wire must be located 2 feet below final grade. The contractor must perform a conductivity test witnessed by the Authority inspector for all water and sanitary sewer mains. The Authority will perform a conductivity test on all water and sanitary laterals prior to installation of the water meter.

Addendum No. 14 Summary
REVISIONS TO THE LTMUA RULES & REGULATIONS

The following sections are to be revised as follows:

5.17 TRACER WIRE FOR OPEN-TRENCH/OPEN CUT CONSTRUCTION UP TO CURBLINE/PROPERTY LINE

Tracer wire must be installed above all water mains and water services. Tracer wire must be high strength copper clad steel (CCS) with a minimum rated break load of 400 lbs (Pro-Trace HF-CCS PE30 10 AWG, Copperhead High Strength 1230 12 AWG or equivalent as determined by the Authority Engineer). The tracer wire jacket must be high density polyethylene (HDPE) or High Molecular Weight Polyethylene (HMWPE).

At all connector/splice locations a moisture displacement connector must be used (Copperhead SnakeBite, 3M DBR or equivalent as determined by the Authority Engineer).

Tracer wire must be brought up at all water valve boxes and curb boxes for testing purposes using a bronze cast pipe ground clamp of an appropriate size. Clamp must utilize stainless steel hardware.

5.18 TRACER WIRE FOR OPEN-TRENCH/OPEN CUT CONSTRUCTION FROM CURBLINE/PROPERTY LINE TO BUILDING

Tracer wire must be installed above all water services. Tracer wire must be 18 AWG Copper as approved by the Lakewood Township Building Department.

Test stations must be installed at every residential home and commercial building. Test stations must be a water proof electrical box (PVC) located a minimum 18"-24" above the ground and located within 5' of the touchpad for the water meter. Tracer wire must be brought to the test station via ¾" schedule 80 PVC conduit from the ground to the box.

5.19 TRACER WIRE FOR DIRECTIONAL DRILLING OR PIPE BURSTING CONSTRUCTION

Tracer wire must be installed above all water mains and water services. Type of tracer wire will be submitted to the Authority for approval at the time of shop drawing review. Tracer wire for directional drilling and pipe bursting construction will be approved by the Authority Engineer on a case by case basis.

6.06 TRACER WIRE FOR OPEN-TRENCH/OPEN CUT CONSTRUCTION UP TO CURBLINE/PROPERTY LINE

Tracer wire must be installed above all sanitary sewer mains and sanitary sewer services. Tracer wire must be high strength copper clad steel (CCS) with a minimum rated break load of 400 lbs (Pro-Trace HF-CCS PE30 10 AWG, Copperhead High Strength 1230 12 AWG or equivalent as determined by the Authority Engineer). The tracer wire jacket must be high density polyethylene (HDPE) or High Molecular Weight Polyethylene (HMWPE).

At all connector/splice locations a moisture displacement connector must be used (Copperhead SnakeBite, 3M DBR or equivalent as determined by the Authority Engineer).

Tracer wire must be brought up at all manholes and cleanout boxes for testing purposes. At the cleanout boxes a bronze cast pipe ground clamp of an appropriate size will be utilized. Clamp must utilize stainless steel hardware. At the manholes the tracer wire will

be brought inside the manhole and a test station must be installed / mounted towards the top of the manhole with a water proof electrical box (PVC).

6.07 TRACER WIRE FOR OPEN-TRENCH/OPEN CUT CONSTRUCTION FROM CURBLINE/PROPERTY LINE TO BUILDING

Tracer wire must be installed above all sewer services. Tracer wire must be 18 AWG copper.

Test stations must be installed at every residential home and commercial building. Test stations must be a water proof electrical box (PVC) located a minimum 18"-24" above the ground and located within 5' of the touchpad for the water meter. Tracer wire must be brought to the test station via ¾" schedule 80 PVC conduit from the ground to the box.

6.08 TRACER WIRE FOR DIRECTIONAL DRILLING, JACK & BORE OR PIPE BURSTING CONSTRUCTION

Tracer wire must be installed above all sanitary sewer mains and sanitary sewer services. Type of tracer wire will be submitted to the Authority for approval at the time of shop drawing review. Tracer wire for directional drilling, jack & bore and pipe bursting construction will be approved by the Authority Engineer on a case by case basis.

7.12.1 ALIGNMENT AND GRADE

Paragraph 1 – No Change

Paragraph 2 – No Change

After 2nd Paragraph add the following paragraph:

Detection tape with aluminum core and copper clad steel tracer wire must be installed above all water and sanitary sewer lines up to the curbline/property line. Detection tape must be located 1 foot below final grade and tracer wire must be located 2 feet below final grade. The contractor must perform a conductivity test witnessed by the Authority inspector for all water and sanitary sewer mains. Tracer wire must be installed in an approved method by the Lakewood Township Building Department for all water and sanitary sewer services from the curbline to the building. The Authority will perform a conductivity test on all water and sanitary laterals prior to installation of the water meter.

Addendum No. 15 Summary
REVISIONS TO THE LTMUA RULES & REGULATIONS

The following sections are to be revised as follows:

3.04 GENERAL REQUIREMENTS FOR WATER LATERAL & WATER MAINS

(1) All water laterals must be 5' below the ground surface.

(2) Connection to the Authority's system must be made by "wet" tapping the line unless special provisions are made. All horizontal and vertical fittings must be securely restrained.

(3) The minimum size of any water lateral to the Authority's system is 1" from the main to the curb box except when the Building Department requires a size larger than 1" from the curb box to the building. If the Building Department requires a size larger than 1", the minimum size of the water lateral to the Authority's system is 1 ½" from the main to the curb box. The service can be less than this on the applicant's property with the approval of the Building Department.

House Service Connection Detail (Detail #12)

Revise Note #9 to read "Service line shall be a minimum of 1 inch type "K" copper from the water main to the outlet side of the curb stop except when the building department requires larger than 1" from the curb stop to the building. When the Building Department requires a service size of larger than 1" the service line shall be a minimum of 1 ½ inch type "K" copper from the water main to the outlet side of the curb stop."

Create Note #10 to read "For outside meter pits, see detail."

Addendum No. 16 Summary
REVISIONS TO THE LTMUA RULES & REGULATIONS

The following sections are to be revised as follows:

1. Created a new detail entitled "Temporary Water Service Abandonment"
2. Created a new detail entitled "Temporary Sewer Service Abandonment"

Addendum No. 17 Summary
July 12, 2016
REVISIONS TO THE LTMUA RULES & REGULATIONS

The following sections are to be revised as follows:

5.17 TRACER WIRE FOR OPEN-TRENCH/OPEN CUT CONSTRUCTION UP TO CURBLINE/PROPERTY LINE

Tracer wire must be installed above all water mains and water services. Tracer wire must be high strength copper clad steel (CCS) with a minimum rated break load of 400 lbs (Pro-Trace HF-CCS PE30 10 AWG, Copperhead High Strength 1230 12 AWG or equivalent as determined by the Authority Engineer). The tracer wire jacket must be high density polyethylene (HDPE) or High Molecular Weight Polyethylene (HMWPE).

At all connector/splice locations a moisture displacement connector must be used (Copperhead SnakeBite, 3M DBR or equivalent as determined by the Authority Engineer).

Tracer wire must be terminated at all water valve boxes and curb boxes for testing purposes. At all valve boxes and curb stops that utilize CC protection boxes the wire must be terminated within the box. For curb boxes without CC protection box tracer wire must be terminated at the box using a bronze cast pipe ground clamp of an appropriate size. Clamp must utilize stainless steel hardware.

5.18 TRACER WIRE FOR OPEN-TRENCH/OPEN CUT CONSTRUCTION FROM CURBLINE/PROPERTY LINE TO BUILDING

Tracer wire must meet the requirements of the Lakewood Township Building Department.

6.06 TRACER WIRE FOR OPEN-TRENCH/OPEN CUT CONSTRUCTION UP TO CURBLINE/PROPERTY LINE

Tracer wire must be installed above all sanitary sewer mains and sanitary sewer services. Tracer wire must be high strength copper clad steel (CCS) with a minimum rated break load of 400 lbs (Pro-Trace HF-CCS PE30 10 AWG, Copperhead High Strength 1230 12 AWG or equivalent as determined by the Authority Engineer). The tracer wire jacket must be high density polyethylene (HDPE) or High Molecular Weight Polyethylene (HMWPE).

At all connector/splice locations a moisture displacement connector must be used (Copperhead SnakeBite, 3M DBR or equivalent as determined by the Authority Engineer).

Tracer wire must be brought up at all manholes and cleanout boxes for testing purposes. At the cleanout boxes the tracer wire must be terminated within the CC protection box. At the manholes the tracer wire must be attached to an added 3/8” thread to the manhole casting (US Foundry Pattern 238-1993 w/threaded hole or approved equal as determined by the Authority Engineer).

6.07 TRACER WIRE FOR OPEN-TRENCH/OPEN CUT CONSTRUCTION FROM CURBLINE/PROPERTY LINE TO BUILDING

Tracer wire must meet the requirements of the Lakewood Township Building Department.

7.12.1 ALIGNMENT AND GRADE

Paragraph 1 – No Change

Paragraph 2 – No Change

Modify 3rd Paragraph to be follows (3rd paragraph created as part of Addendum #14):

Detection tape with aluminum core and copper clad steel tracer wire must be installed above all water and sanitary sewer lines up to the curbline/property line. Detection tape must be located 1-2 feet below final grade and tracer wire must be located 4 feet below final grade. The contractor must perform a conductivity test witnessed by the Authority inspector for all water and sanitary sewer mains and laterals up to the curbline. Tracer wire must be installed in an approved method by the Lakewood Township Building Department for all water and sanitary sewer services from the curbline to the building as and if required by the building department.

CHANGES TO CONSTRUCTION DETAILS

1. Create a new detail # 42 entitled “Requirements for Precast Manhole Channels”
2. Revise Detail #s 19, 20, 37 & 38 to permit precast manhole benches and channels.
3. Revise Detail #s 27 & 28 for the deep service connections to change the requirement from an iron cap to a CC-6 box for the lateral riser in the unpaved areas.

Addendum No. 18 Summary
September 8, 2016
REVISIONS TO THE LTMUA RULES & REGULATIONS

The following section is to be created:

2.04.3 REQUIREMENT FOR ALL INDIVIDUAL CONNECTION APPLICATIONS

The Authority requires all applicants, property owners, general contractors and subcontractors to have the Authority named as additional insured on certificates of insurance.

The following section is to be revised as follows:

2.05.3 FINAL APPROVAL <u>Submission Requirements.</u>

(8) “Proof of Insurance” is to be revised to be “Certificate of Insurance for applicant(s), property owner(s), general contractor(s) and subcontractor(s) naming the Authority as additional insured”

Addendum No. 24 Summary
February 6, 2018
REVISIONS TO THE LTMUA RULES & REGULATIONS

The following sections are to be created/revised as follows:

2.05.2 TECHNICAL APPROVAL

Submission Requirements. Items required to be submitted for technical approval are as follows:

(1) Application(s)
(2) Fees
(3) Approved Conceptual Plan
(4) Detailed Construction Drawings
(5) Engineer's Report(s)
(6) Approved Construction Cost Estimate
(7) Developer's Agreement
(8) Easements
(9) Hydraulic Direction Drill (HDD) plans, specifications and reports (if applicable)

3.09.8 HYDRAULIC DIRCTIONAL DRILL

The designs for projects that require a Hydraulic Directional Drill (HDD) must comply with "ASCE Manuals and Reports On Engineering Practice No. 108, Pipeline Design for Installation by Horizontal Directional Drilling". The applicant must provide two (2) copies of the following items for the Authority's review and approval:

(1) Topographic Land Survey by a licensed Professional Land Surveyor of the proposed HDD location including all existing features, property lines and easements with book and page numbers.
(2) A geotechnical report and subsurface survey of the proposed HDD location. Geotechnical report shall contain engineering analysis, boring logs, test results and a geotechnical profile of the subsurface conditions.
(3) Construction Plans prepared by a Professional Engineer from the State of New Jersey of the HDD containing the following information:
    a. Limit of Disturbance
    b. Plan View of the proposed HDD
    c. Profile of the proposed HDD including information from the subsurface survey
    d. Topographic and Subsurface Features that could potentially impact the proposed HDD
    e. Existing and Proposed Easements necessary for the HDD
    f. Drilling and Receiving pits including dimensions for each
    g. Drill entry point
    h. Drill exist point
    i. Drill entry angle
    j. P.I. elevation
    k. Radius of curvature
    l. All critical stress strain points must be identified on the profile
    m. Detail of the connection points of the HDPE pipe used for the HDD to the ductile iron pipe.

(4) Report prepared by a licensed Professional Engineer from the State of New Jersey containing all calculations for the proposed HDD design as per "ASCE Manuals and Reports On Engineering Practice No. 108, Pipeline Design for Installations by Horizontal Directional Drilling". The report will contain but is not limited to the following information:
   a. P.I. Elevation
   b. Radius of Curvature calculations
   c. Stress and Strain calculations

(5) As-Built Survey of the HDD. This can be incorporated as part of the As-Built survey for the entire project.

In addition to the above items, the contractor is required to have a spill remediation plan onsite at all times during the HDD process in case of the unlikely scenario of a failure during the HDD process.

5.01.6 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

HDPE water mains are only permitted in directional drilling construction. All HDPE pipe must be fusible PE 4710 DR 9 as classified by ASTM D3350 "Standard Specification for Polyethylene Plastics Pipe and Fittings Materials" or a classification as indicated in the submitted HDD reports and specifications, whichever is a higher pressure strength.

Size of Pipe – This specification shall cover all sizes of HDPE pipe. Only 3" – 24" pipe sizes will be permitted in the system without specific approval by the Authority.

Joint Type – Pipe will be fused using "butt-fusion" procedures that follow manufacturer's instructions and recommendations and meet or exceed ASTM F2620 "Pipe – Design and Installation" standards.

Pressure Class – Pipe shall meet pressure class as described in AWWA C901-08 for PE 4710 DR 9 pipe or a classification as indicated in the submitted HDD reports and specifications, whichever is a higher pressure strength.

Storage – Pipe shall be stored and protected from sunlight and the elements. Sunburnt or weather worn pipe shall be rejected.

Addendum No. 25 Summary
March 6, 2018
REVISIONS TO THE LTMUA RULES & REGULATIONS

The following sections are to be created/revised as follows:

2.05.5 REQUIREMENTS FOR METER INSTALLATION

Fees. All connection fees, meter fees, offsite contributions, etc. as required by the Authority's Rules and Regulations and as agreed to in a Developer's Agreement must be paid prior to installation of a meter. A positive escrow balance as deemed acceptable by the Authority Engineer or CFO must be maintained. If the balance is below the acceptable balance, a meter will not be installed.

Water & Sanitary Sewer Systems. Water and sanitary sewer systems must pass all final testing and disinfection procedures as described in Section 7.16 & 7.21 of these regulations prior to installation of any meters in a development.

As-Built Drawings. As-Built drawings meeting Authority requirements as described in Section 7.19 of these regulations must be submitted to and approved by the Authority prior to the installation of any meters in a development.

2.05.6 PERFORMANCE GUARANTEE REDUCTION

Change section # from 2.05.5 to 2.05.6

Remove As-Built Review section

2.05.7 PERFORMANCE GUARANTEE RELEASE & ACCEPTANCE FOR OWNERSHIP

Change section # from 2.05.6 to 2.05.7

2.05.8 MAINTENANCE GUARANTEE RELEASE

Change section # from 2.05.7 to 2.05.8

3.04 GENERAL REQUIREMENTS FOR WATER LATERALS

Create #4 to indicate "Meters shall be installed in either a meter pit or meter vault at the property line in a grass area or in a location that will not contain vehicular traffic. If a curb stop exists at the property line the meter pit must be installed immediately following the curb stop between the curb stop and the building. Any deviation from this requirement must be approved by the Authority Engineer"

3.06 INDIVIDUAL RESIDENTIAL CONNECTIONS

Remove Meter and Yoke section.

5.08 VAULTS AND MANHOLES

Revise title to be "Vaults (Non-meter) and Manholes"

5.20 METER PITS AND METER VAULTS

For all meters up to 1" in size the meter pit shall be the Ford Meter Box Company Coil Pit Setter with H-20 Rated Composite Flat Lid with Plastic ERT Bracket #PPSC-18-L-P-BR or Approved Equal. Meter pit depth must be a minimum of 60" regardless of actual water service line depth.

For all meters 1 ½" and 2" in size the meter pit shall be the Ford Meter Box Company Plastic Pit Setters for 1 ½" and 2" Meters with Monitoring Cover with Electronic Meter Reading Lid with Plastic Inner Lid #MC-36-MB-T or Approved Equal. The heavier lid for driveway traffic and the Ford Insulating Disc are required. Meter pit depth must be a minimum of 60" regardless of actual water service line depth.

For all meters larger than 2" in size the meter must be installed in a prefabricated concrete vault as indicated on the Authority construction detail for meter vaults or as approved by the Authority Engineer.

7.19 AS-BUILT INFORMATION

As-Built drawings are to be prepared by a licensed surveyor in the state of New Jersey. In addition to field work required to obtain topographical and invert information, the surveyor is required to use inspection reports and contractor's notes to complete the drawings with information not able to be obtained during field work. Upon approval of the As-Built drawings 4 sets of signed and sealed plans, 2 sets of signed and sealed mylars and an autocad version of the As-Built drawings must be submitted to the Authority.

The Contractor is responsible for gathering and maintaining field as-built information including all distances between valves and fittings, all clearances at crossings, all changes, and all important notes. This information must be available to the licensed surveyor preparing the As-Built drawings upon request.

As-Built drawings must be in strict compliance with the Authority's approved As-Built Drawing Checklist.

The Authority requires that As-Built drawings for developments be submitted to and approved by the Authority prior to the occupancy of any unit within a development. The Authority will not provide or install a meter in the development prior to the approval of As-Built drawings for the development.

If all houses have not been constructed, providing swing ties to all curb stops, cleanouts, valves, manholes, etc., may not be practical. At the discretion of the Authority Engineer, the Authority may permit the applicant to complete the As-Built drawings prior to performance guarantee release conditioned that all information with the exception of swing ties is provided on the As-Built drawings prior to the first meter being installed in a development.

Addendum No. 26 Summary
April 11, 2018
REVISIONS TO THE LTMUA RULES & REGULATIONS

The following sections are to be created/revised as follows:

Revise Construction Detail #13 "Service Line with Meter Pit Detail"

Revise Construction Detail #16 "5/8" or 1" Meter Pit Detail"

Revise Construction Detail #17 "1 ½" or 2" Meter Pit Detail"

5.20 METER PITS AND METER VAULTS

For all meters up to 1" in size the meter pit shall be the Ford Meter Box Company Coil Pit Setter with H-20 Rated Composite Flat Lid with Plastic ERT Bracket #PPSC-18-L-P-BR or Approved Equal. Meter pit depth must be a minimum of 60" regardless of actual water service line depth. Please refer to the Authority Approved "5/8" or 1" Meter Pit Detail."

For all meters 1 ½" and 2" in size the meter pit shall be the Ford Meter Box Company Plastic Pit Setters for 1 ½" and 2" Meters with Monitoring Cover with Electronic Meter Reading Lid with Plastic Inner Lid #MC-36-P-BR or Approved Equal. The heavier lid for driveway traffic and the Ford Insulating Disc are required. Meter pit depth must be a minimum of 60" regardless of actual water service line depth. Please refer to the Authority Approved "1 ½" or 2" Meter Pit Detail."

For all meters larger than 2" in size the meter must be installed in a prefabricated concrete vault as indicated on the Authority construction detail for meter vaults or as approved by the Authority Engineer.

5.21 FIRE SERVICE LINE DETECTOR CHECK VALVES

All fire service lines are required to have a detector check valve installed at the property line. The detector check shall be the HERSEY Model EDC IV Check Valves with spring loaded main check valve & optional trim kit and bypass meter connection or Approved Equal. The check valves shall be installed in a meter vault at a minimum depth of 60". The check valves shall have a Sensus 5/8" iPerl meter installed.

The check valves for any fire services smaller than 3" will be approved by the Authority Engineer on a case by case basis.

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SECTION 1 - GENERAL

1.01 AUTHORITY

These Rules and Regulations are promulgated by the Commissioners of the Lakewood Township Municipal Utilities Authority.

The enforcement of these Standards is hereby delegated by the Commissioners to the Executive Director. The Authority's Consulting Engineers will assist the Executive Director by reviewing the plans, fees and guarantees for compliance with these Standards.

1.02 EFFECTIVE DATE

These Rules and Regulations shall be effective immediately upon adoption by the Authority and shall supersede all former Rules and Regulations.

1.03 INTRODUCTION AND PURPOSE

This document has been prepared to define the Rules and Regulations of the Lakewood Township M.U.A. (the Authority). More specifically, these are the Rules and Regulations of the Authority regarding the application for service by the Authority. Any individual requesting water or sewer service or modification of existing water or sewer service within the Authority's service boundary is required to make application to the Authority. These Regulations supersede the Regulations for Sewer System Facilities adopted April 21, 1981 and for water system facilities adopted August 20, 1975, and revised 1978.

1.04 REVISIONS OR AMENDMENTS

These Rules and Regulations may be revised or amended at any time by the Authority. All revisions and amendments shall be binding and of full force and effect, when adopted. Any revisions to the current editions of Standards such as ASTM, AWWA and ANSI shall automatically be made part of these Standards. Revision of these Rules and Regulations will be made by Resolution by the Authority.

1.05 AUTHORITY'S CONTROL

These Rules and Regulations will apply to the application for service, plan submission, installation, operation and maintenance of all water and sewer facilities under the control of the Authority. Such control will be exercised in accordance with the Authority's Rules and Regulations.

The Authority retains the ability to vary from these Rules and Regulations if it feels that such variance is in the Authority's best interest. The Authority shall not be restricted or limited in the exercise of its lawful powers. No action, direct or indirect, of or by any person, including any owner, operator or agent of an owner or operator of any facility in making any connection, disconnection, repair or otherwise doing work with respect to any facility served from the Authority's system, in violation of these Standards, shall continue after discovery of such violation, or the enforcement of corrective action as to such violation.

1.06 INTERPRETATION OF THESE DOCUMENTS

The Rules and Regulations including the Engineering Standards contained therein are intended to be complimentary to each other and a requirement occurring in one is as binding as though occurring in both. Should any discrepancy or misunderstanding arise or a situation occur which is not specifically covered by these documents, the Authority or its agents shall interpret the intention of the documents. This interpretation shall be final and binding on the applicant.

The Authority's Standards shall be interpreted as incorporating all current Standards such as ASTM, AWWA and ANSI and any and all federal, State and local regulations which apply. These Standards shall be binding on the applicant whether or not specifically referenced in the Authority's Rules and Regulations.

The interpretation of any section, or of differences between sections, when appropriate, shall be made by the Executive Director and that interpretation shall be binding and controlling in its application.

1.07 PURPOSE FOR THE AUTHORITY TO OVERSEE AND MANAGE

The Authority is established to oversee and manage the potable water and sanitary sewage collection systems within its service area boundaries. To meet this purpose requires development of water resources, complying with the requirements governing water production, product testing, maintenance of facilities, assessment of charges, review and inspection of proposed facilities for individual development and assistance or construction of regional water distribution and sanitary sewage collection systems.

1.08 RESPONSIBILITY FOR CONSTRUCTION OF FACILITIES

The construction of facilities from the Authority's existing facilities to individual properties is the responsibility of the property owner who will benefit from the construction of the facilities. In the case of a land developer, it is the developer's responsibility to provide the water distribution system and sanitary sewage collection system for the development.

1.09 INTENT OF REVIEW PROCEDURE

It is the intent of the Authority's application and review procedure to retain low costs while providing a high quality product and services to current and future customers. This will be done by requiring that the costs of facilities proposed to provide service to the applicant are not borne by the current customers, that the facilities proposed will be constructed so as to minimize operation and maintenance costs and to assure that the facilities proposed will not only service the immediate area but also the ultimate service area of the Authority.

This mandates that the review of proposed facilities will not only investigate an application on its ability to provide service to the applicant's project, but also to verify that the systems as proposed will assure systematic construction of a unified water distribution and sewage collection system for the entire service area.

Due to this fact, it may be required that a proposed facility may need to be constructed in a manner other than that which is most economical for the individual applicant. In general, no reimbursement will be made by the Authority for over sizing of facilities; revisions to alignment or increased depth of facilities to be installed if, in the Authority's opinion, it is a reasonable cost to be borne by the applicant. If it is, in the Authority's opinion, determined that these items cannot be provided at a reasonable cost to the applicant, then the Authority may choose to assist with the costs of construction of the facilities. The method of assistance to be negotiated between the Developer and the Authority. Any costs incurred by the Authority for negotiations or preparation of this agreement shall be paid by the applicant. This would include but not be limited to professional fees paid by the Authority.

1.10 LIMITATION OF APPROVAL

These Rules and Regulations together with any approval, permit or certification issued by the Authority shall in no circumstances be assumed or construed to supplant any rule, regulation, or approval of any local, State or federal agency. It shall be the applicant's sole responsibility to ascertain which permits, approvals and reviews are required for his project by any governing agency and obtain those permits. Failure of the Authority or its agents to verify that required permits are in place prior to the commencement of construction shall in no way relieve the applicant of his sole responsibility to obtain said permits.

1.11 REVOCATION OF APPROVAL

The Authority reserves the right to revoke, modify or suspend any approval in whole or in part for any of the following reasons:

1) Violation of any term or condition of the approval

2) Misrepresentation or failure to disclose any relevant facts as part of the application.

3) Change in State or federal standards.

4) Modification of the Plans following approval without the Authority's approval.

5) Modification of conditions adjacent to or near the proposed facilities.

All approvals or permits issued by the Authority will be limited to a maximum period of one (1) year. If the Project has not moved to the next phase of the approval process within the one year period the approvals shall be rescinded and the applicant will have to reapply unless he has received an extension of the approval.

1.12.1 ABBREVIATIONS

(a) AASHTO: American Association of State Highway and Transportation Officials.

(b) ACP: Asbestos Cement Pipe

(c) ANSI: American National Standards Institute

(d) APHA: American Public Health Association

(e) ASTM: American Society for Testing Materials

(f) AWWA: American Water Works Association

(g) C.I.P.: Cast Iron Pipe

(h) DIP: Ductile Iron Pipe

(i) LTMUA: Lakewood Township Municipal Utilities Authority

(j) MJ: Mechanical Joint

(k) NSF: National Sanitary Foundation

(l) PVC: Polyvinyl Chloride Plastic Pipe

(m) RCP: Reinforced Concrete Pipe

(n) VCP: Vitrified Clay Pipe

1.12.2 DEFINITIONS

As used in these Standards, unless the context shall otherwise require, the words defined in this paragraph shall have the meanings herein ascribed:

(a) Authority: The Board of Commissioners of the Lakewood Township Municipal Utilities Authority.

(b) Applicant for System Extension: Any person, association, corporation, entity, or government agency, often a subdivider or developer, desiring water service for premises under their control. Also referred to as the Applicant.

(c) Contractor: An individual or company employed by an Applicant to construct the system extension.

(d) Distribution System: Water mains together with all appurtenant and necessary valves, fire hydrants, taps, meters, service lines and associated materials, property and equipment used to transport potable water to individual consumers.

(e) Ductile Iron: The cast ferrous material in which the free graphite present is in a spheroidal form.

(f) Engineer: The Authority appointed Engineer or a representative of his staff.

(g) Flange Joint: The flanged and bolted joint as detailed in Table 10.14 of ANSI/AWWA C110/A21.10-82.

(h) Inspector: The authorized representative of the Authority or Authority's Engineer.

(i) Main Extension: Extensions to the distribution system.

(j) Manufacturer: The party that produces the product.

(k) Mechanical Joint: A bolted joint of the stuffing-box type as detailed in Table 10.1 of ANSI/AWWA C110/A21.10-82 and as described in ANSI/AWWA C111/A21.11, American National Standard for Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings, of the latest revision.

(l) Off-Site Sanitary Sewage Collection: Shall mean the complete sanitary sewage collection system to be constructed outside of a project's boundaries which will be necessary to provide for the collection and conveyance of sanitary sewerage to the Authority's existing facilities.

(m) On-Site Sanitary Sewage Collection: Shall mean a complete sanitary sewerage collection system within a project which will be necessary to provide sewer service to a project. The system shall include, but not be limited to, mains, connections, manholes, laterals, and appurtenances which shall be necessary to provide sanitary sewer service to a project.

(n) Off-Site Water Distribution: Shall mean the complete water distribution system to be constructed outside of the project's boundaries which will be necessary to convey potable water to the project from the Authority's existing water distribution system.

(o) On-Site Water Distribution: Shall mean the complete water distribution system within a project's boundaries which will be necessary to provide water service to a project. The systems shall include, but not be limited to, mains, fittings, valves, valve boxes, manholes, fire hydrants, and appurtenances which may be deemed necessary to the Authority to provide adequate water service to a project.

(p) Service Line: All pipe, fittings, and appurtenances for conveying water from distribution mains to the individual consumer.

(q) Sewer Service: Shall mean providing capacity to convey all sanitary sewerage effluent, generated by the project through the facilities of the Authority to the facilities of the Ocean County Utilities Authority for treatment and processing.

(r) Tap: Physical connection of the service line to a distribution main which effects water service to individual consumers.

(s) Water Department: The plant, facilities, system, assets, and personnel controlled by the Board pursuant to its charter authority also referred to as the Water Department, the Department, or the Authority.

(t) Unit: Shall mean one (1) residential dwelling designed for one or more persons living together as a household contained within a single or multi-family building. For non-residential use, a unit is defined as one equivalent dwelling unit for each 280 gallons per day of water consumption as estimated by the New Jersey Department of Environmental Protection Consumption Statistics.

(u) Water Main or Distribution Main: A pipe along public streets or appropriate rights-of-way used for transporting water to individual consumers.

(v) Water Service: Shall mean providing potable water to the project.

SECTION 2 - APPLICATION FOR SERVICE

2.01 REQUIREMENT FOR APPLICATION

Any individual property owner or land developer or an agent representing a property owner wishing to build any facility within the Authority's service area which will require potable water and/or from which sewage will be generated shall make application to the Authority. The Authority's service area boundaries are shown on Exhibit 1 of this Document. This service area boundary may be revised from time to time as deemed necessary by the Authority. Application must be made to the Authority whether or not the applicant desires water or sewer service from the Authority.

2.02 CONTENTS OF THIS SECTION

This Section is intended to assist the applicant in the determination of what type of application is required. Along with the general description, this Section gives a listing of what materials are required to accompany the application. Details for material required for each type of application is given in Section 3, "Technical Standards for Application". Fees for application are detailed in Section 4 regarding Fees and Guarantees. The Authority's service area boundaries are shown on Exhibit 1 of this Document.

2.03 LETTER OF NO INTEREST

Submission Requirements.

(1) Application, type written or neatly printed.
(2) Fees, in accordance with the Fee Schedule.
(3) Plans, in accordance with the Engineering Standards.

If the applicant feels that the property should not be served by sewer and/or water he may request a letter of No Interest from the Authority. The Executive Director shall examine the project to determine if it is feasible to connect the Authority's system. If the Executive Director has technical questions or if he feels the project requires technical review he may request a review of the project by the Authority's Engineer. All review fees incurred by the Authority will be paid for by the Applicant. The Executive Director will advise the Authority of the findings.

If the Authority finds that the applicant's property need not be served by public sewer or water the Authority shall direct the Executive Director to issue a letter of No Interest or inform the applicant that the construction of dry sewer and/or water lines will be required. Dry facilities will allow for connection at some future date.

A letter of No Interest will only be issued if, in the Authority's opinion, it appears that service to the proposed project is unlikely in the foreseeable future. The issuance of a letter of No Interest will mean that if in the future the Authority's system is extended and the property owners wish to connect to the Authority's system it shall be the property owners responsibility to make application to the Authority and pay for any costs associated with the extension of any facilities required to service the properties in question.

If the Authority feels that the applicant must install dry facilities then the applicant will make application to the Authority under the regulations for system extension as any other applicant to the Authority.

2.04 INDIVIDUAL CONNECTIONS

These applications are to be used for connection to the Authority's facilities which currently exist, not if they are to be constructed by the applicant or to be constructed in the future. If any of the facilities to be constructed by the applicant will be turned over to the Authority for ownership the connection will be part of the Plan Review Process for system extension. If they are to be constructed by others then the applicant must wait to make application until such time as the facilities have been accepted for operation by the Authority. If the applicant wishes to extend a lateral to a nonexistent facility or a facility not in operation, a notarized Letter of Acknowledgement must be sent to the Authority detailing the facts and verifying that the Authority will be held harmless should service not become available for any reason. If the applicant is a corporation or represents a corporation, this Letter must have a corporate acknowledgement statement attached. This Letter must be reviewed and approved by the Authority's attorney.

2.04.1 INDIVIDUAL RESIDENTIAL CONNECTION

Submission Requirements. Application will include the following:

(1) Application, type written or neatly printed.
(2) Fees.
(3) Plans.

This application is intended to be used for an individual residence to be constructed within the Authority service area which is proposed to be serviced by a privately owned well or septic tank or existing Authority water and sewer facilities. If the Authority agrees that the individual residence is too remote to be able to be economically serviced by the Authority's facilities they will direct the Executive Director to issue a letter of no-interest. If it is determined that the residence can be connected to the Authority's facilities then the connection will be made by means of a lateral installed by a property owner or the owner's agent. All of the facilities proposed to be constructed will be retained for ownership and maintained by the property owner. All costs for the connection shall be borne by the property owner unless the Authority agrees to an alternate arrangement.

The Plans will be reviewed by the Authority's Executive Director and Chief Engineer. Approval shall be by the Executive Director. Observation of the installation of the facilities will be under the supervision of the Chief Operator. Should the review or inspection procedure require the services of consultants, testing laboratory or the Authority's professionals, the applicant must reimburse the Authority for any and all expenses incurred.

Approval of the Plans shall be by letter from the Executive Director.

2.04.2 INDIVIDUAL INDUSTRIAL/COMMERCIAL CONNECTION

Submission Requirements. Application will include the following:

(1) Application, type written or neatly printed.
(2) Fees.
(3) Plans.

This application is intended to be used for an individual industrial or commercial connection to an existing water or sewer facility owned by the Authority. The application can be made by the property owner or his agent acting in his behalf. If the applicant is a corporation, the application must include an Ownership Statement, Appointment of Agent Statement, Corporate Acknowledgement Statement and a copy of the Certificate of Incorporation. All of the facilities proposed to be constructed will be retained for ownership and maintenance by the property owner.

The Plans shall be submitted to the Authority. Plans will initially be reviewed by the Authority's Executive Director. If the Executive Director needs technical assistance he shall pass the application on to the Authority's Engineer for further review and/or comment. Any agreements or legal documents will be reviewed by the Authority's Attorney. Observation of the installation of the facilities will be under the supervision of the Chief Operator. Should the review or inspection require more work than is usual or additional services of outside consultants and/or testing laboratories, the applicant agrees to reimburse the Authority for any and all expenses incurred.

Applications that will require a N.J.D.E.P. Permit to construct will require plans and profiles to be reviewed and recommended for approval by the Authority's Engineer. These applications will also require a resolution by the Authority approving the plan and granting the Executive Director authority to sign the CP-1 form.

Approval of the Plans shall be by letter from the Executive Director.

2.05 SYSTEM EXTENSION

Submission Procedure. If the applicant wants to construct water or sewer facilities that will be accepted for ownership by the Authority, the applicant must submit an application to the Authority for a system extension. All documents will be submitted to the Authority. The Authority will send copies of all the information to the Engineer for review. Applications and construction plans will be reviewed by the Authority's Engineer prior to presentation to the Authority. The Authority's Engineer will respond directly to the applicant's Engineer with any technical concerns. If the applicant wishes to be copied on all correspondence he should indicate this on the application.

When the Engineer finds the applicant has met all requirements for approval, excepting items that can only be addressed by the Authority itself, the Engineer will write the Executive Director informing him of this fact. Upon receiving this letter, the Executive Director will place the applicant on the Engineer's agenda for the review and possible approval of the project by the Authority. Approval for each stage of the project will be made by Resolution of the Authority at its regularly scheduled meeting. In general, only one approval stage will be heard at each of the regularly scheduled meetings.

Number of Copies. Submissions will include three (3) copies of all material to be submitted. The material required for each approval stage is listed below. If, in the Engineer's opinion additional information is required for review the applicant must submit the additional information required. Failure to submit information requested can be grounds for rejection of the application.

Additional Permits. It shall be the applicant's responsibility to prepare all documents that are required for application to other agencies for permits or approval. The applicant shall submit copies of all such documents to the Authority for review. The applicant shall send all originals requiring signatures to the Authority. The originals must be clearly marked where signatures are required with blue highlighter. The names should be typed below the area required for signature. The applicant will retrieve and forward all documents to the appropriate agencies. Copies of all cover letters or other correspondence to reviewing agencies shall be sent to the Authority in triplicate. Neither the Authority or its agents shall assume any responsibility for the failure of an applicant to obtain any permits required for a project nor shall the Authority assume any responsibility for the accuracy or completeness of any application for permit.

2.05.1 CONCEPTUAL APPROVAL

Submission Requirements. Items required to be submitted for conceptual approval are as follows:

(1) Application
(2) Fees
(3) Conceptual Plan
(4) Preliminary Construction Cost Estimate

The review of plans for conceptual approval will be to determine basically what facilities will be required to provide service to the applicant's property. This will include verifying that the proposed facilities comply with the Master Plan of the Authority and verifying the Plans submitted meet all the technical requirements as detailed in the Engineering Standards. If it is determined that no Master Plan exists for the area the applicant must make a request of the Authority to develop a Master Plan for the area. Adoption of the Master Plan will be by Resolution of the Authority.

The Engineer will also review the Plans to determine if any of the facilities proposed by the applicant are to be constructed on lands which are not owned by the applicant. If it is determined that the applicant will be constructing facilities on land which he does not own then the applicant must enter into an off-site facilities agreement with the Authority. The completion of the off-site facility agreement will not be a requirement for conceptual approval but will be a requirement for the technical approval. The Applicant's Engineer shall prepare a preliminary construction cost estimate based on the Plans submitted for conceptual approval. This preliminary construction cost estimate will be used to determine the application fees for technical approval. Approval of conceptual plans will be by Resolution of the Authority.

2.05.2 TECHNICAL APPROVAL

Submission Requirements. Items required to be submitted for conceptual approval are as follows:

(1) Application
(2) Fees
(3) Approved Conceptual Plan
(4) Detailed Construction Plans
(5) Engineer's Report
(6) Approved Construction Cost Estimate
(7) Off-Site Facilities Agreement (Optional)
(8) Easements

Intent of Technical Review. It is the intent of the technical review to verify that the plans and other documents comply with technical requirements found in Section 3 of the Engineer's Standards and that the amounts of the fees and guarantees are properly computed. Approval at this level will include authorization of the Executive Director to sign applications for other permits required for the project where applicable. Approval at this stage does not authorize the applicant to begin any construction of the facilities proposed.

Technical approval by the Engineer shall include review of the detailed Construction Plans and Specifications, Engineer's Report, Easements and Off-Site Facilities Agreement. Part of the technical review will include the preparation of an approved Construction Cost Estimate. This will be prepared by the applicant's Engineer and reviewed by the Authority's Engineer. Technical approval will include approval of this Construction Cost Estimate. This will be used to calculate the fees and guarantees required for final approval.

2.05.3 FINAL APPROVAL

Submission Requirements. Items required to be submitted for final approval are as follows:

(1) Application
(2) Fees
(3) Approved Plan
(4) Performance Guarantees
(5) Permits
(6) Recorded Easements
(7) Shop Drawings and Certifications
(8) Proof of Insurance
(9) Approved Traffic Safety Plan
(10) Fire Commissioners Certificate

Intent of Final Review. It is the intent of the final review to verify that all fees, guarantees, and other documents have been received and are acceptable prior to commencement of construction.

For final approval the Engineer shall review the approved plans, performance guarantees, connection fees, permits, recorded easements, shop drawings, certifications and proof of insurance.

Approved Plans. It is the responsibility of the Applicant to notify the Authority Engineer if the plans have ben modified following technical approval. The Engineer shall verify that there are no revision dates added after the technical approval date. If the Plans have been modified after the technical approval the applicant must supply the Engineer with a detailed explanation of what has been changed, especially any item which may affect the Authority's facilities. The Engineer will report to the Authority all changes to the Plans. If the Authority deems that the Plans have been substantially modified since the technical approval they may recommend to the Authority that the applicant go through the technical approval process again. This may include new submission of application and fees for technical approval if the changes so warrant.

Performance Guarantees. The Engineer shall review the performance guarantees to determine if the amounts correspond to the approved construction cost estimate and the current Construction Cost Estimate Schedule. The applicant should note that the Authority updates its construction cost estimating schedule periodically and it is the applicant's responsibility to verify that the construction cost estimate has not been modified due to a revision to the construction cost estimating schedule. The estimating schedule is in effect on the date that the final applicant is deemed complete for review shall be the schedule used to calculate the Cost Estimate and all corresponding fees and guarantees.

Permits. The Engineer shall review the permits obtained for the project to determine if the permits are still current. Neither the Authority nor any of its agents will review the project to determine what permits are required for the project. Neither the Authority nor any of its agents will assume any responsibility for the failure of an applicant to obtain a permit which is required.

Recorded Easements. The Engineer will review the recorded easements to verify that they agree with the easements which were submitted for the technical approval and that they have been recorded. The Applicant may delay recording of all easements until request for performance guarantee reduction or release is made to the Authority.

Shop Drawings and Certifications. The Engineer will review the shop drawings and certifications to verify that the materials being supplied meet the specifications submitted for the project.

Proof of Insurance. The applicant will submit proof of insurance in the amounts specified in Section 3. The Engineer will review the insurance to verify the amounts are correct. The Authority's attorney will review the documents to verify the form is acceptable and that the Authority is adequately protected by the policy.

2.05.4 REMEDIAL ACTION SUBSEQUENT TO FINAL APPROVAL

Even though the Plans may have received final approval by the Authority, if it is determined at any time that the facilities will cause the Authority difficulty in operation, maintenance, or increased maintenance costs the Authority reserves the right to require the applicant to make whatever modification may be necessary to alleviate the problem. This shall specifically not be limited to the Plan Review Stage of the project. If it is determined, during the review of the plans or construction of the facilities that the facilities as proposed or constructed would cause a problem with the operation or maintenance of facilities, the quality or quantity of effluent, or they endanger the public or have the potential for endangering public health and safety, the Authority may require the applicant to revise the Plans or modify facilities as required to rectify the situation.

The Authority will determine what action will be required to rectify the problem. Any expenses incurred by the Authority for this will be reimbursed by the applicant. These expenses may include but not be limited to engineering fees, attorney's fees, laboratory tests, and soil analysis.

2.05.5 PERFORMANCE GUARANTEE REDUCTION

(1) Letter Requesting Reduction
(2) Fees
(3) Copies of the Performance Guarantees
(4) Copies of any Previous Guarantee Reductions
(5) As-Built Information
(6) Escrow Balance Statement
(7) Connection Fee Statement

Intent of Performance Guarantee Reduction. The intent of the Performance Guarantee Reduction is to allow the Applicant to reduce the performance guarantee that is in place if he has met all requirements for reduction. The Project file will be reviewed to verify that all items required for reduction of the Bond have been complied with.

Reduction Procedure. Upon receipt of this request, the Authority will direct the Engineer to review the Project to verify that all items required for Bond reduction have been complied with. This will include verification that all facilities have been installed, inspected and tested. A physical inspection of all facilities will be conducted to verify that they are operational. The Engineer will review as-built drawings, performance guarantee, previous guarantee releases, escrow balance and connection fee payment statements.

Verification of Testing. The Engineer will review the inspection file to verify all facilities being considered for reduction have been tested for final acceptance.

Physical Inspection. The Engineer will have a physical inspection of all facilities conducted to verify that the sanitary collection and water distribution systems for comply with all operational requirements of the Authority's Regulations. Pavement must be within 1" of the Final Design Elevations and all landscaped areas over utilities must be graded and stabilized.

As-Built Review. The Engineer will review the as-built drawings for compliance at this stage. The as-built drawings may not be complete but must include inverts of the sanitary sewer and ties to cleanouts, water valves and locations of hydrants.

Escrow Balance and Connection Fee Statements. The applicant must obtain an escrow balance and connection fee statement from the Authority as part of the procedure for Performance of Guarantee Reduction. If the Applicant owes money on any previous accounts or has failed to pay all connection fees, the Authority will not accept an application for the reduction of the performance guarantee. This statement may not contain all charges if the Project is still incurring expenses, but will give an indication if adequate funds are still available to reimburse the Authority for any remaining charges. The performance guarantee release will not be processed by the Authority and no further work will be authorized by the Authority if the escrow balance is found to be negative. If the applicant has made special provisions for delayed payment of connection fees, a copy of this agreement along with a letter from the Authority indicating that the applicant has lived up to the terms of the agreement, should also be provided to the Engineer along with the application.

2.05.6 PERFORMANCE GUARANTEE RELEASE & ACCEPTANCE FOR OWNERSHIP

Submission Requirements.

(1) Application
(2) Fees
(3) Copies of Performance Guarantees
(4) Maintenance Guarantee
(5) As built Drawings
(6) Escrow Balance Statement
(7) Connection Fee Payment Statement

Intent of Performance Guarantee Release Review. The intent of this review stage is to verify that all items proposed have been complied with prior to release of the performance guarantee.

Only after all of the facilities as shown on the approved Plans have been installed, tested, inspected, all other utilities have been installed for the project, and all restoration over the Authority's facilities has been completed may the applicant request release of the performance guarantee and acceptance of the facilities for ownership by the Authority.

Release Procedure. Upon receipt of this request, the Authority will direct the Engineer to review the project to verify that all items required for release and acceptance for ownership have been complied with. This will include the review of as-built drawings, the maintenance guarantee, the escrow balance statement, the bill of sale or deed of ownership for the facilities and preparation of the permit to operate.

Maintenance Guarantee. The Engineer will review the maintenance guarantee to verify that the amount is based on the approved construction cost estimate. It again should be noted that if the Authority has revised its construction cost estimating schedule that the amount of the maintenance guarantee will be changed. The amount of the maintenance guarantee will be calculated using the quantities from the as built drawings and the construction cost estimating schedule that is in effect at the time the request for performance guarantee is deemed complete. The applicant's Engineer is responsible for submitting the summation of quantities from the as built plans and revising the construction cost estimate accordingly. The applicant must have the maintenance guarantee reviewed by the Authority attorney to verify that it is in proper form.

Escrow Balance and Connection Fee Statements. The applicant must obtain an escrow balance and connection fee statement from the Authority as part of the procedure for Performance of Guarantee Release. If the Applicant owes money on any previous accounts or has failed to pay all connection fees, the Authority will not accept an application for release of the performance guarantee. This statement may not contain all charges if the Project is still incurring expenses, but will give an indication if adequate funds are still available to reimburse the Authority for any remaining charges. The performance guarantee release will not be processed by the Authority and no further work will be authorized by the Authority if the escrow balance is found to be negative. If the applicant has made special provisions for delayed payment of connection fees, a copy of this agreement along with a letter from the Authority indicating that the Applicant has lived up to the terms of the agreement, should also be provided to the Engineer along with the application.

Bill of Sale. The applicant must submit a bill of sale or deed of ownership for all facilities that are to be owned and operated by the Authority. The bill of sale will be reviewed as to quantities of materials by the Engineer to verify that they agree with the as built plans. The form of the bill of sale will be reviewed by the Authority's attorney for proper form.

Acceptance for Ownership. Approval of the performance guarantee release will automatically mean acceptance of the facilities for ownership by the Authority unless specifically indicated otherwise. Release of the performance guarantee and acceptance for ownership shall be done by Resolution of the Authority. Following this release, the Authority will authorize the Engineer to issue a permit to operate the facilities.

Permit to Operate. The Engineer will prepare the permit to operate all facilities which have been accepted for ownership by the Authority.

2.05.7 MAINTENANCE GUARANTEE RELEASE

Submission Requirements.

(1) Application
(2) Fees
(3) Copies of Maintenance Guarantee
(4) As built Drawings
(5) Escrow Balance Statement
(6) Connection Fee Payment Statement

Intent of This Review. It is the intent of this review stage to verify that all facilities are operating properly and all fees have been paid prior to the release of the maintenance guarantee. One year after the facilities have been accepted for ownership by the Authority or such other period of time which has been imposed due to special circumstances, the applicant shall be eligible for the release of the maintenance guarantee.

Release Procedure. Upon receipt of the request the Authority will direct the Engineer to inspect the facilities and review all the documents.

Inspection of Facilities. Inspection of the facilities will be to verify that all items are accessible and functioning properly. This will include verification that all valve boxes and manhole frames and covers are accessible. Any discrepancies noted must be repaired prior to release. Any major items found may be required to be bonded for an extended period after they are repaired. If it is determined that a chronic maintenance item exists, the Authority may direct the Engineer to prepare a list of options for the Authority to review. The Authority will then review these options and select a course of action. These may include but not be limited to the following:

(1) Accept the facilities as constructed.

(2) Accept the facilities if the applicant pays a fee sufficient that the interest from the fee is adequate to fund the maintenance of the facilities.

(3) Require the facilities to be removed and reconstructed in a manner acceptable to the Authority. This will include going through the review process for the plans to remove and relocate.

Escrow Balance and Connection Fee Statements. The applicant must obtain an escrow balance and connection fee statement from the Authority as part of the procedure for Maintenance Guarantee Release. If the applicant owes money on any previous accounts or has failed to pay all connection fees, the Authority will not accept an application for release of the maintenance guarantee. If the applicant has made special provisions for delayed payment of connection fees a copy of this agreement along with a letter from the Authority indicating that the applicant has lived up to the terms of the agreement should also be submitted to the Engineer along with the application. The Authority will run an updated escrow balance statement within 60 days of the approval of the maintenance bond release. The Authority will not release the maintenance bond if the escrow balance is negative.

SECTION 3 - TECHNICAL STANDARDS FOR APPLICATION

3.01 LETTER OF NO INTEREST

Content. The plan accompanying the application for a letter of no interest is intended to show the relative location of the applicant's property from the Authority's existing system.

Plan. For an application of four (4) units or less, the plan may be made on a copy (copies) of a tax map(s). The plan should indicate the location of the applicant's property and the nearest location of the Authority's facilities. The tax maps are at a scale of 1"=100'. If the Authority's facilities are greater than 3000 feet from the applicant's property, the applicant may use the 1"=100' map to show his property and use the key map from the tax map to show the relationship between this property and the Authority's facilities. The key maps are at a scale of 1"=600'.

Preliminary Cost Estimate. If the Executive Director or Engineer determines that a preliminary cost estimate is required the applicant will prepare this estimate. This estimate will only be prepared after it is agreed upon what facilities would be required to be constructed to comply with the Authority's Master Plan for the area.

Pre-Application Meeting. The applicant may meet with the Executive Director or the Chief Operator to discuss the project and determine what facilities exist and what facilities are required to be constructed. If the applicant or the Authority finds that an outside consultant needs to be present, the applicant must pay the fees incurred. Fees required to reimburse the Authority for all expenditures shall be posted in advance.

3.02 INDIVIDUAL SERVICE CONNECTION

All individual service connections must comply with the following requirements.

3.03 GENERAL REQUIREMENTS FOR BOTH WATER AND SEWER CONNECTIONS

1. All laterals must be dimensioned from property corners.

2. All water and sewer laterals must be reviewed by the Township building officials and a plumbing permit obtained prior to the start of any construction.

3. The plumbing permit must be shown to the construction observer when he witnesses the connection to the Authority's system.

4. Applicant is responsible for obtaining all building, road opening or other permit which may be required for the project. Copies of these permits shall accompany the application for service.

5. The plans shall be approved by the Authority prior to commencement of construction.

6. The Contractor must have a copy of the approved plans on the site at the time of connection.

7. The Authority must be notified at least 48 hours in advance of the commencement of construction.

8. All connections to the Authority's system must be witnessed by a representative of the Authority.

9. The quantity of water demand and sewage flow generated shall be calculated for each project site in accordance with these Standards.

10. The quality of water discharged, if other than standard domestic discharge, must be formulated and submitted to the Ocean County Utilities Authority (OCUA) for review and approval. All items regarding quality of discharge must be addressed to the OCUA. The Authority will not allow discharge of any substances which violate the Regulations of the OCUA.

3.04 GENERAL REQUIREMENTS FOR WATER LATERAL

1. All water laterals must be 5' below the ground surface.

2. Connection to the Authority's system must be made by "wet" tapping the line unless special provisions are made. All horizontal and vertical fittings must be securely restrained.

3. The minimum size of any water lateral to the Authority's system is 1" from the main to the curb box. The service can be less than this on the applicant's property with the approval of the Building Department.

Materials for Water Laterals

1. Tapping Sleeve. All sleeves should be a Mueller Mechanical Joint. Split sleeve type tapping sleeve or approved equal. The Authority will also allow stainless steel tapping sleeves with stainless nuts and bolts as constructed by JCM, Inc.

2. Ductile Iron Pipe. All water mains 4" or larger must be cement lined Ductile Iron Pipe with a minimum wall thickness of Class 52 and shall conform to ANSI A21.51-1976 (AWWA C151) or latest revision. Pipe exterior must have Standard Foundry Coal Tar Epoxy coating.

3. Copper Water Lines. All services 2 inches or less must be Type K soft temper, conforming with the requirements of ASTM Specifications B88. Fittings shall be flared or compression fittings approved by the Township Plumbing Department.

4. Ductile Iron Fittings. All ductile iron fittings shall be cement lined Mechanical Joint meeting the requirements of ANSI/AWWA C110-77. Mechanical Joints shall conform to ASA 21.11. Cement lining shall conform to ASA 21.4 and shall include a bituminous seal coat. The exterior of all fillings must have a Standard Foundry Coal Tar Dip Coating.

3.05 GENERAL REQUIREMENTS FOR SEWER LATERALS

1. Sewer laterals should be connected to existing lateral stubs wherever possible.

2. Connections of sewer laterals to existing manholes should be avoided. If necessary, however, the connection to the existing manhole must be made by coring the existing manhole in accordance with the Detail for Connection to Existing Manhole. Internal drop connection must meet all the requirements as indicated on the Internal Drop Connection Detail. Explicit details of this connection must be made on the plans to allow the reviewer to determine if this internal drop will interfere with access within the manhole.

3. Connections of laterals to existing sanitary sewer pipe must be made by coring the existing sanitary sewer pipe and installing a saddle. The saddle must be a double stainless steel strap saddle. Care will be taken not to over tighten the straps thus damaging the Authority's lines

Materials for Sewer Laterals

1. POLY VINYL CHLORIDE (PVC). Sewer pipe for laterals shall, as a minimum, conform to ASTM D-1785, Schedule 40, "Type PSM Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings". Sewer pipe for main sanitary sewer lines shall, as a minimum, conform to ASTM D-3034, DR 35. Joints shall be integral bell, Bell and Spigot type rubber gasket joint. Bell shall be integral complete with single rubber gasket conforming to ASTM D-3212.

2. Ductile Iron Pipe. Sewer pipe for laterals shall conform to ASA Specifications A21.51 minimum thickness Class 52. Joints shall conform with ASA Specification A21.11 with single elongated grooved gasket similar to United States Cast Iron Pipe companies "Tyton" Joint or equal. Gaskets shall be of a composition suitable for exposure to sewage.

3. Fittings. All fittings, plugs, adapters, wye tees, wyes or other fittings must be the same material as the pipe unless alternate materials are approved by the Authority's Engineer.

4. Markings. All pipe and fittings shall be clearly marked on the outside surface with trade name, pipe size and class designation.

3.06 INDIVIDUAL RESIDENTIAL CONNECTIONS

Plan Size. Drawings shall be submitted on sheets measuring 8-1/2"x11", 11"x17", 15"x21" or 24"x36".

Scale. Drawings should be at a scale no less than 1"=30', preferably 1"=10'.

Content. The plan should show the location of the building and proposed location of water and sewer laterals clearly marked. The plan must indicate the materials to be used. All materials must comply with the materials indicated within these Regulations, in the specifications and as shown on the Service Connection Detail.

Meter and Yoke. Meter must be held in place by means of Mueller Meter Yoke or approved equal.

Meter must be provided with Remote Readout. Meter and Remote Readout location and wiring must be approved by the Authority.

Plan Approval. Plans for all connections must be approved by the Authority prior to construction.

Inspection. All water and sewer installations must be witnessed by the LTMUA and/or all other appropriate agencies. Notice of proposed construction must be given to the LTMUA at least 48 hours in advance of any construction.

3.07 INDIVIDUAL COMMERCIAL/INDUSTRIAL CONNECTIONS

Plan Size. Drawing shall be submitted on sheets either 15"x21" or 24"x36"

Scale. Drawings should be at a scale no less than 1"=30', preferably 1"=10'.

Observation Manhole. All commercial/industrial sewer connection, regardless of present intended use must provide an Observation/Sampling Manhole for use by the LTMUA or OCUA. The location of this manhole must be approved by both Authorities and the Township Building Department. No change in horizontal or vertical direction will be allowed within the manhole or within 10 feet either side of the manhole. Construction must comply with the Detail. This Detail must be on the drawing.

Plan Approval. Plans for all connections must be approved by the Authority prior to construction.

Inspection. All water and sewer installations must be witnessed by the LTMUA and/or all other appropriate agencies. Notice of proposed construction must be given to the LTMUA at least 48 hours in advance of any construction.

Separate Fire and Domestic Services. Fire service line and domestic water line should be run separately. If the applicant wishes to bring a single line to within 5 feet of the building and then branch the connection, a letter must be submitted to the Authority indicating the applicant holds the Authority harmless for any problems associated with this type of connection.

Thrust Restraint. All horizontal fittings for water lines 4" or larger shall be securely restrained by means of thrust blocks. All vertical fittings must be restrained by means of a combination of retainer glands and tie rods or thrust blocks in accordance with the Vertical Deflection Detail.

3.08 CONCEPTUAL APPROVAL

3.08.1 CONCEPTUAL PLAN

Content. The Conceptual Plan is intended to show the facilities to be constructed to service the development. Facilities should be marked clearly as to whether they are existing or proposed. The proposed facilities must clearly indicate any facilities that are not to be owned by the Authority. Plans need not show exact internal lots or service connection to the lots. Plans should include a typical example of service connection.

Plan Size. Drawings shall be submitted on sheets measuring 24" x 36".

Scale. Drawings shall be at a scale of not less than 1"=200'. If required for clarity additional plans must be submitted to view the entire project and proposed connections to the Authority's system on a single sheet. If in the Authority Engineer's opinion details of areas of concern are required, additional plans at larger scale may be required.

Street Names. Street names must be shown on the Plans.

Private Streets. Internal private roadways for the development should be shown on the Plans.

Size. Size and material of all existing facilities must be shown. Size of all proposed facilities must be shown. Materials shall be assumed to conform with the requirements of the Authority unless specifically indicated otherwise.

Title Block. Title Block must include all information pertinent to the drawing. Room should be left for numbering of the drawing by the Authority.

Project Limits. Limits of the project must be indicated and the development should be clearly depicted.

Units. Plan should indicate numbers of units to be serviced, average size and type of unit to be serviced.

Water Demand. Projected average and peak water demand should be indicated in gallons per minute (GPM), gallons per hour (GPH) and gallons per day (GPD).

Sewer Capacity. Projected sewer capacity requirements should be indicated in gallons per day (GPD). This should include both average daily flow and peak daily flow.

General Information. All pertinent general information such as streams, bridges, North Arrow, etc., which might impact the facilities required.

Valves. All proposed and existing system valves should be shown. Hydrant valves need not be shown.

Hydrants. All proposed and existing hydrants should be shown.

3.08.2 PRELIMINARY CONSTRUCTION COST ESTIMATE

Initial Submission. The applicant's Engineer should calculate the cost of the proposed facilities using the amounts listed in the Authority's construction cost estimating schedule.

Final Submission. The applicant's Engineer must revise the preliminary cost estimate to reflect any changes in the Conceptual Plan. This estimate will be the estimate used to calculate the fees for technical review. This estimate will not be used to calculate bonds and fees for final approval.

3.09 TECHNICAL APPROVAL

3.09.1 CONSTRUCTION PLANS

Content. Construction plans are intended to give the Contractor constructing the facilities all information required for that construction. This information must be clearly indicated on the Plans so that the Contractor in no case must scale distances to determine the location of facilities to be installed.

Plan View. The plans must clearly indicate the horizontal alignment of the proposed water and sewer facilities and their relationship with any and all existing or proposed improvements. This will include but not be limited to the distance from centerline, curb line, buildings or other structures which are near the proposed facilities. All existing or proposed facilities which cross the water or sewer lines must be indicated. If the facilities are existing and the elevations are not known the same note requiring exposure of these facilities that is indicated on the profile must also appear on the plan view.

Horizontal Alignment. A ten foot (10') horizontal separation shall be maintained between all water and sewer facilities wherever possible. All facilities shall be kept at least 5 feet from the curb line when installed parallel to the curb and not less than 3 feet from the curb or other utilities at the nearest point. Facilities shall not be installed under the curb, gutter or sidewalk without specific approval of the Authority, except when crossing perpendicular to these facilities.

Clearance from Buildings. Water and sewers shall be maintained a distance of 15 feet from all buildings where the utilities are parallel to the building and at least 10 feet from the closest point on the building. In no case shall the utility be closer to the foundation than the difference in elevation between top of the footing and the invert of the utility plus 5 feet.

Generally, water and sewer facilities will not be allowed to be installed between two buildings less than 30 feet apart. The applicant must show all improvements in areas of this nature to include sidewalks, decks, raised planter beds, etc. The applicant must indicate how this area will be restricted from the construction of any surface improvements in the future.

Sanitary Sewer Alignment. The sanitary sewer will be designed to generally lie within the centerline of the roadway for secondary streets or in the center of the outside lane on the opposite side of the street from the water main within major highways.

Water main Alignment. Water mains in general shall be located on the north or west side of the roadway. On curvilinear roadways the water main shall be designed to maintain the horizontal alignment parameters and minimize the crossings of other utilities.

3.09.2 PROFILES

General. All elevations must be based on NGVD. The location and elevation of the nearest benchmark must be indicated in the General Notes for each sheet. The Design Engineer must establish adequate benchmarks for the area to assist the Contractor in verifying grades. All utilities which cross the proposed facilities must be shown on the profile and their elevation given. Any facility whose depth is not known should be clearly indicated and a note added indicating, "The Contractor shall expose prior to construction and verify the elevation of these facilities".

Water Profiles. The profile of the water line must indicate that the water line will have a 5' minimum cover. Any deviation from the 5' depth of dover must be clearly indicated and specified as to whether the depression will be attained by deflection of the joints or by the use of vertical fittings. All fittings, valves, air release valves, areas to be insulated, fire hydrants or other items shall be indicated on the plan. All valves and hydrants must be numbered.

Sewer Profiles. The profile of the sanitary sewer lines must indicate length of pipe, size, material and slope of the facility. Manholes must be clearly numbered and all invert information must be given for each manhole. Elevation of the surface must be indicated to the nearest 0.1 foot. Sewer inverts must be shown to the nearest 0.01 foot. The minimum cover for sanitary sewer shall be four feet (4') unless specific provisions are made for structural and thermal protection of the facilities.

Separation of Utilities. At crossings all utilities should be separated by at least 18 inches. If the 18" separation is impossible to maintain then the utilities will be protected in accordance to the following schedule:

1. Water main over sanitary sewer, 9"-18"
   Water main DIP/with concrete cradle, 10' each side
   Sanitary sewer PVC/concrete encased, 10' each side of crossing

2. Water main over sanitary sewer, 2"-9"
   Water main DIP/with concrete saddle
   Sanitary sewer DIP

3. Sanitary sewer over water main, 9"-18"
   Water main MJDIP, 20' each side of crossing

4. Sanitary sewer over water main, 2"-9"
   Sanitary sewer/concrete cradle, 5' each side
   Water Main MJDIP, 20' each side of crossing

5. Storm sewer over sanitary sewer, 9"-18"
   Storm sewer/with concrete cradle, 10' each side
   Sanitary sewer/concrete encased, 10' each side
   or sanitary sewer DIP, manhole to manhole.

8. Storm sewer over sanitary sewer, 2"-9"
   Storm sewer/with concrete cradle, 10' each side of sanitary sewer
   Sanitary sewer DIP, manhole to manhole

Size. Drawings shall be submitted on sheets measuring 24" x 36".

Scale. Drawings shall be at a scale large enough to allow easy determination of the intent of the Plans. In general if the Plans are to be used for construction of all utilities (i. water, sanitary sewer, gas, storm sewers, pavement, etc.), the Plans should be 1"=30' to 1"=20'. If the Plans are for installation of water and sewer only the Plans may be at a smaller scale, but generally not smaller than 1"=50'.

Utilities. In all cases the Plans must include the location of all existing or proposed utilities within twenty feet (20') of the proposed facilities. This includes overhead utilities.

Rights-of-Way. The limits of rights-of-way shall be clearly marked on the Plans.

Private Streets. All privately owned streets shall be marked as such.

Pavement. The limits of pavement must be shown atypical. A pavement section shall be included for each street whether or not the proposed facilities are under pavement. In the case of existing streets the applicant shall contact the appropriate agency and determine the maximum extent of widening that may occur and if possible, the approximate date that it will occur. This information should be shown on the Pavement Section for the appropriate street. The letter indicating the maximum paving section should be included in the Engineer's Report.

Other Utilities. All utility crossings shall be shown on the Profile. This shall include but not be limited to gas, electric, storm, etc.

Buildings and Appurtenances. Plans should indicate the location of all buildings and include decks, sidewalks and any other permanent improvements to the property existing or proposed that will be within 20 feet of the proposed utilities.

Valves. Valves must be shown on the Plans and Profiles. Valves should be located at all intersections and spaced no more than 600 feet apart. Valves shall be placed such that no more than one block must be out of service in the case of a main break. Valves shall be numbered.

Fire Hydrants. Fire hydrants must be placed such that all building faces are within a 600 ft. hose lay of a fire hydrant. Hydrant locations must be approved by letter from the Board of Fire Commissioners.

Hydrant Valves. Hydrant valves should be placed on the hydrant tee at the main unless special conditions dictate a different location. If the distance between the fire hydrant and the main is greater than 24 feet an additional valve should be placed on the line within 4 feet of the hydrant.

Sidewalks. Water mains should not be located under sidewalks.

Utility Crossings. In general, water and sewer lines should cross other utilities as close to perpendicular as possible.

Manholes. Manholes shall be spaced a maximum of 400 feet apart for sewers 18 inches and less. For sewers over 18 inches the manholes shall be spaced a maximum of 500 feet apart. Manholes shall be provided at any change in pipe size, vertical or horizontal alignment or wherever a lateral greater than 6 inches connects to the Authority's system.

Manholes shall be installed at the end of each sewer line, at all changes in grades, size or alignment, and at all intersections.

All manholes must be accessible by vehicle for maintenance. If a manhole must be located outside of a paved roadway an all weather surface drive must be provided, within a recorded easement, to allow the Authority access to the manhole. The access roadway should be at least 10 feet wide and curves should be designed for a 30' (AASHO-SU) design vehicle. Long or curving access roads will require an area for the truck to turn around.

Manholes should be kept 5 feet from the curb and in no circumstance less than 3 feet from the curb. If calculations indicate that any portion of the frame and cover is inundated during a 10 year storm. The frame and cover must be water tight in accordance with the Technical Specifications for Watertight Frames and Covers.

Pipe Connections to Manholes - In general, sewer service lines will not be allowed to connect to manholes. No sewer service should connect to the main line closer than 5 feet from a manhole.

Standard Manholes - For 15" and smaller pipe, manholes shall have a 48" inside diameter. For pipe larger than 15", manholes shall have a 60" inside diameter. Where a second sanitary sewer line enters a manhole, the invert on the second sewer line shall enter the manhole at least 0.2' higher than the invert of the main sewer line and shall enter the line of flow of the main sewer line with as near a full sweep 90 degree bend as possible. In no case shall a second line be allowed to intersect with this main line at an angle less than 90 degrees with the outlet portion of the main line. If alignment and slope allow, the sewer line shall be laid through the manhole. A drop of 0.1' will be required from invert to outlet where the sewer main cannot be laid through the manhole.

Sanitary Sewer Design. Sanitary sewers shall be designed in accordance with all requirements of federal, State and local agencies.

Sanitary Sewer Alignment. If possible the sanitary sewer will be generally designed to remain in the center of the road. The sewer shall be kept five feet (5') from the curb and in no circumstance shall the sewer be installed less than 3 feet from the curb or under curb gutter or sidewalk.

3.09.3 ENGINEER'S REPORT

An Engineer's Report shall be submitted for the project detailing the design parameters used for the project. This Report must be signed and sealed by a Professional Engineer registered in the State of New Jersey. As a minimum, the Report shall include:

Water

(1) Parameters used to determine the residual pressure within the system.

(2) Parameters used to determine water demand for the project.

(3) Parameters used to determine fire flows for the project. The Authority recommends that the ISO Standards be used.

The system must be designed to provide a minimum residual pressure of 20 PSI at any location using the fire flows plus maximum day demand.

Sewer.

(1) Parameters used to calculate sewage flows.

(2) Listing of each critical section of sewer indicating:

(a) Maximum capacity for the line.
(b) Maximum velocity flowing full.
(c) Maximum flow anticipated for the area at full development.
(d) Maximum velocity anticipated with full development.
(e) Velocity for average flow this development only.
(f) Average flow generated by this development.
(g) Average flow generated by off site development.

(3) Average flows must be submitted. The following parameters are to be used as the minimum flows.

(a) Single-family Residential - 350 Gal/Unit/Day Avg.

(b) Multi-family Residential - 270 Gal/Unit/Day Avg.

(c) Age Restricted (1 & 2 Bedroom) - 165 Gal/Day/Unit Avg.

(d) Commercial and industrial properties shall be calculated using the N.J.D.E.P. Rules and Regulations for the Preparation and Submission of Plans for Sewer Systems and Wastewater Treatment Plants, Section 19 - Package Treatment Plants, Subsection 19.5 - Design Flow for Small Plants for Various Establishments.

(e) Warehousing Facilities - Submit full calculations and parameters used for these calculations.

(4) Permits. Correspondence concerning permits and all permit applications should be appended to the Engineer's Report. All sanitary sewer extensions and any facility generating average flows exceeding 2000 Gal/Day will require a NJDEP Permit to Construct.

(5) Pavement. The design engineer for the applicant must determine the pavement section, including curbs and sidewalks which exist, or may exist, in the foreseeable future for any right-of-ways (ROW) that will have water or sewer facilities installed within them. All correspondence with the appropriate agencies should be included in the Engineer's Report indicating present or proposed improvements.

3.09.4 APPROVED COST ESTIMATE

Approved cost estimate will not be prepared until the detailed construction plans are reviewed by the Authority's Engineer. After the design and alignment are agreed to by the Authority's Engineer, the applicant's Engineer shall prepare a cost estimate for the proposed facilities using the unit prices listed in the Authority's Construction Cost Estimating Schedule. If the Authority makes any revisions to the plans, the applicant must update the Cost Estimate. This Estimate will then be used to calculate the fees for final approval and the guarantees for the proposed facilities.

3.09.5 OFF-SITE FACILITIES AGREEMENT

If facilities are to be installed by the applicant on property not owned by the applicant, he must have an Off-Site Facilities Agreement in place prior to the granting technical approval. The Off-Site Facilities Agreement must be reviewed and approved by the Authority's Attorney prior to the granting of final approval of the plans.

3.09.6 EASEMENT DOCUMENTS

Plan. A plan must be submitted showing the easements. The plan must include a metes and bounds description of the easement. The plan should be on a 24" x 36" sheet unless a different plan size is approved by the Authority's Engineer.

3.09.7 PERMITS AND FEES

All permits required for the project must be identified at this stage of the project and listed in the Engineer's Report. Copies of all permit applications should be appended to the Engineer's Report.

All permits requiring the signature of the Executive Director should be submitted to the Authority and clearly marked as to where the Executive Director is to sign. Any fees which are required to accompany the permits must be paid by the applicant. These checks need not be submitted to the Authority for review.

Fees which are owed to the Authority are detailed in Section 4 of the Rules and Regulations.

The Authority will mail the permits to the Applicant's agent when the permits are signed unless other arrangements are made with the Authority.

3.10 FINAL APPROVAL

3.10.1 APPROVED PLANS

Six (6) copies of the approved plans must be submitted. These plans must be signed and sealed by the Engineer who prepared them. A cover letter must accompany the submittal listing all items submitted and clearly stating that the plans have not been modified after Technical Approval was granted. If the plans were modified, the Engineer must give a detailed description of all items changed and how they affect the proposed facilities. If the modifications affect the proposed facilities, the Authority's Engineer will review the plans to determine if the plans will need to go back to the technical review phase. If there is a question regarding the re-review, the Engineer will present the plans to the Authority for a determination.

3.10.2 PERFORMANCE GUARANTEES

Four (4) copies of the performance guarantees must accompany the submission. The original must be submitted to the Authority's Attorney for review at least 15 days prior to the Authority's meeting. The Attorney will review the form of the guarantee for acceptance. The Authority's Engineer will verify the amount of the guarantee.

3.10.3 MAINTENANCE GUARANTEE

The maintenance guarantee is not submitted at the time of final approval. The maintenance guarantee is required to be posted prior to release of the performance guarantee. If the Authority has revised their unit prices for their Construction Cost Estimate Schedule, the maintenance guarantee will need to be recalculated.

3.10.4 CONNECTION FEES

Connection fees are due prior to final approval. Connection fees are calculated as indicated in the Authority's Rate Schedule.

SECTION 4 - GUARANTEES AND FEES

4.01 GENERAL INFORMATION REGARDING GUARANTEES AND FEES

4.01.1 METHOD OF PAYMENT

Fees. All fees submitted should be in the form of a certified check made payable to "The Lakewood Township Municipal Utilities Authority" or approval will be contingent upon check clearing.

4.01.2 APPLICATION FEES

Application fees are intended to cover the cost of the Authority for the processing of the application. If it is determined that the application requires more work than is covered by the original application fee the Authority may assess the applicant additional fees. These fees will be calculated by the Executive Director based on a fee schedule adopted by the Authority at its annual Reorganization Meeting.

4.01.3 REVIEW FEES & INITIAL ESCROW DEPOSITS

Review fees and initial escrow deposits calculated or stipulated as minimums in the subsequent sections of these Rules and Regulations are intended as initial deposits to be held in escrow by the Authority. These escrow accounts will be used to reimburse the Authority for all expenses incurred by the Authority for the applicant's project. These expenses will include but not be limited to engineering fees, attorney's fees, construction observation fees, laboratory analysis and consultants fees.

In the event that the escrow account falls below twenty percent (20%) of the original amount deposited, the applicant shall, within ten (10) days of receiving written notice from the Authority, bring the account up to a level equal to fifty percent (50%) of the original amount.

If the applicant fails to bring the account up to an acceptable level the Authority will have the right to take any or all of the following actions:

(1) Cease all work being done on the project.

(2) Transfer any funds being held by the Authority into any other account or into any other form to reimburse the Authority for any expenses.

(3) Notify the Contractor to cease all work on the project due to the fact that no representative of the Authority will be there to observe the construction.

(4) Make claim against any bonds, letters of credit or other guarantee held by the Authority.

(5) Make claim against any assets owned by the Applicant.

(6) Place a lien against the property for which the application has been made.

4.01.4 ESCROW ACCOUNTING PROCEDURE

It is anticipated that within sixty (60) days of the completion of each phase of the project the Authority will be able to notify the applicant as to the status of the project escrow account for that phase. This would obviously be extended if for any reason be approved with contingencies which would extend the phase of the project.

If there are fees remaining in an escrow account to be closed the Executive Director will notify the Authority and the Authority will authorize the return of the excess funds by Motion.

If there is a deficiency of fees, the Executive Director will notify the applicant of this deficiency in writing. If the applicant fails to make payment in full within ten (10) days of receipt of the letter the Executive Director will halt all work on the project and send out a second notice by Registered Mail. Failure to make payment in full within thirty (30) days of the date of the Registered Letter will nullify all approvals for the project and the Authority will take whatever action necessary to obtain full payment for fees incurred.

Failure of the Authority to notify the applicant within this time frame shall in no way affect the charges incurred by the developer. Release of funds shall not release the applicant of his responsibility to reimburse the Authority for any charges incurred or discovered in the future which were a result of this project.

4.02 AMOUNTS OF FEES AND GUARANTEES

4.02.1 LETTER OF NO INTEREST

Application Fee	$ 100.00
Project Review Fee (Escrow)	$ 400.00

4.02.2 INDIVIDUAL RESIDENTIAL CONNECTION

Application Fee	$ 10.00
Review Fee	$ 30.00

4.02.3 INDIVIDUAL COMMERCIAL/INDUSTRIAL CONNECTION

Application Fee	$ 100.00
Project Review Fee (Escrow)	$ 1,000.00

4.02.4 SYSTEM EXTENSION

4.02.5 PRE-APPLICATION MEETING (Optional)

Initial Deposit (Escrow)	$ 500.00

4.02.6 CONCEPTUAL PLAN

Application Fee . . . . . $ 100.00

Project Plan Review Fee:
Initial Escrow Deposit ($900.00 Minimum):

Deposit Per Unit	No. of Units
$20.00	1 - 100 Units
$10.00	100 + Greater

4.02.7 TECHNICAL APPROVAL

Application Fee . . . . . $ 100.00

Project Plan Review Fee:
Initial Escrow Deposit ($1,500.00 Minimum):
Two percent (2%) of Preliminary Construction Cost Estimate

4.02.8 FINAL APPROVAL

Application Fee . . . . . $ 100.00

Project Review Fee:
Initial Escrow Deposit ($900.00 Minimum):
One percent (1%) of the Approved Construction Cost Estimate

4.02.9 CONSTRUCTION OBSERVATION

Application Fee . . . . . $ 100.00

Initial Escrow Deposit ($2,000.00 Minimum):
Eight percent (8%) of the Approved Construction Cost Estimate

4.02.10 OFF-SITE DEVELOPERS AGREEMENT (If Required)

Application Fee . . . . . $ 100.00

Initial Escrow Deposit ($1,000.00 Minimum):
One percent (1%) of the Preliminary Construction Cost Estimate

4.02.11 EARLY PERMIT TO OPERATE (Optional)

Application Fee . . . . . $ 100.00

Initial Escrow Deposit ($500.00 Minimum):
One percent (1%) of the Approved Construction Cost Estimate

4.02.12 PERFORMANCE GUARANTEE REDUCTION REQUEST (Optional)

Application Fee . . . . . $ 100.00

Initial Escrow Deposit ($900.00 Minimum):
One percent (1%) of the Approved Construction Cost Estimate

4.02.13 PERFORMANCE GUARANTEE RELEASE

Application Fee . . . . . $ 100.00

Initial Escrow Deposit ($900.00 Minimum):
One percent (1%) of the Approved Construction Cost Estimate

4.02.14 MAINTENANCE GUARANTEE RELEASE

Application Fee . . . . . $ 100.00

Initial Escrow Deposit ($900.00 Minimum):
One percent (1%) of the Approved Construction Cost Estimate

4.02.15 MASTER PLAN DEVELOPMENT (If Required)

Application Fee - . . . . . $ 100.00

Initial Escrow Deposit . . . . . $ 1,000.00

4.03 GUARANTEES

4.03.1 PERFORMANCE GUARANTEE

FORM. The form of the Performance Guarantee shall be a combination of cash and other surety. The form must be found acceptable to the Authority's Attorney.

Cash. Cash portion shall be a certified check made payable to "The Lakewood Township Municipal Utilities Authority".

Other Security. The other security can be in one of the following forms:

(1) Cash (as indicated above).

(2) Letter of Credit can be submitted which must be irrevocable and automatically-perpetually renewable until released by the Authority unless the issuing bank notifies the Authority of its expiration in writing at least sixty (60) days prior to it expiration.

(3) Performance Bond can be submitted which must be issued by a duly licensed insurance or bonding company authorized to do business in the State of New Jersey.

AMOUNT. The amount of the Performance Guarantee shall be a total of one hundred twenty percent (120%) of the Approved Construction Cost Estimate. The approved construction cost estimate shall be updated, if necessary, using the construction cost estimating schedule which is in effect at the time the application for final approval is deemed complete for review. The amounts shall be reviewed by the Engineer to verify compliance with amounts required. The total shall be made as follows:

(1) Cash portion shall be ten percent (10%) of the Approved Construction Cost Estimate.

(2) Other security or portion of the Guarantee shall be equal to one hundred ten percent (110%) of the Approved Construction Cost Estimate.

4.03.2 MAINTENANCE GUARANTEE

FORM. The form of the Maintenance Guarantee shall be cash. The cash shall be a certified check made payable to "The Lakewood Township Municipal Utilities Authority".

AMOUNT. The amount shall be ten percent (10%) of the Approved Construction Cost Estimate. The approved construction cost estimate shall be updated , if necessary, using the construction cost estimating schedule which is in effect at the time the application for performance guarantee release is deemed complete for processing.

4.04 CONNECTION FEES

Connection fees shall be in accordance with the Authority's Rate Schedule.

SECTION 5 - MATERIALS FOR WATER SUPPLY

5.01 PIPE

All materials in this Specification shall conform to the latest editions of applicable ASTM, AWWA, ASA and ANSI Standards. Pipe classes indicated shall be considered minimums.

It shall be the responsibility of the Applicants Architect and Design Engineer to design the water supply system in accordance with the latest appropriate design standards and for the actual site conditions. Proof of design may be requested by the Authority's Engineer as part of the review process.

Generally, all distribution mains will be a minimum of 8 inch diameter designed in a balanced loop system providing the project with water supply from two directions. Dead ends are to be avoided if possible. If it is unavoidable, then the dead end shall be a maximum of 500 feet and have a flushing hydrant at its terminus.

5.01.1 ASBESTOS-CEMENT PIPE

The Authority does not allow the installation of asbestos-cement pipe within the Authority's service area.

5.01.2 DUCTILE IRON PIPE (DIP)

All ductile iron pipe furnished under this Specification shall be manufactured in strict accordance with AWWA C151 and shall conform to the following additional requirements:

Size of Pipe - This specification shall cover all sizes of ductile iron pipe 24" in diameter and smaller. All service lines 4" and larger shall be Ductile Iron Pipe.

Joint Type - Push-on joint single gasket or mechanical joint single gasket conforming to the requirements of AWWA C111.

Thickness Class - Pipe shall be furnished with the following minimum thickness class:

24" diameter and smaller - Class 52

Laying Length - Pipe shall have a nominal laying length of 18 or 20 feet.

Grade of Iron - Iron used in the manufacture of pipe shall have 60/42/10 iron strength.

Protective Coatings - The surface finish of all pipe shall conform to the following:

Interior - Pipe shall have standard thickness cement mortar linings in accordance with AWWA C104 and ANSI A21.4-85.

Exterior - Pipe shall have manufacturer's standard bituminous coating.

5.01.3 POLYVINYL CHLORIDE (PVC) PIPE

PVC water mains are generally not allowed to be used within the Authority's service area boundary. PVC mains will only be accepted by specific approval of the Authority.

All PVC pipe furnished under this Specification shall be manufactured in strict accordance with AWWA C900 and shall conform to the following additional requirements:

Size of Pipe - This specification shall cover all sizes of PVC pipe.

Joint Type - Joints shall be formed of pipe having integral thickened wall bells with a rubber ring seal, assembled using non-toxic lubricant to form a water-tight pressure seal.

Thickness Class - Pipe shall be furnished with a minimum thickness Class 150 (DR18), with a 4 to 1 safety factor and with the appropriate fittings.

Laying Length - Pipe shall have a nominal laying length of 20 feet.

Storage and Handling - Pipe shall be stored to protect it from sunlight. Sunburned pipe shall be rejected. Bedding of pipe is critical for proper pipe operation and shall be in strict accordance with these Specifications.

5.01.4 COPPER WATER LINES

Copper tubing for underground service shall be Type K Soft Temper, conforming with the requirements of ASTM Specification B88. Fittings shall be flared or compression fittings when approved by the Engineer.

5.01.5 STEEL CASING PIPE (AWWA C200)

Smooth wall casing shall be of welded steel construction and shall be new material with a minimum yield point of 35,000 psi. The minimum thickness shall be in accordance with requirements of the regulatory agency, but shall in no case be less than the sizes indicated in the following Table. The casing pipe shall be cleaned and coated both inside and outside with coal tar epoxy paint meeting Specification C-200(A) or SSPC Paint 16. The casing pipe in its final position shall be straight and true in alignment and grade, and there shall be no space between the earth and casing.

Casing Size	Min. Casing Thickness With 1:4 Grout	Without Grout
a. 8" - 24"	3/8" - .375	1/2" - .5
b. 26" - 34"	1/2" - .5	5/8" - .625
c. 36" & Larger	5/8" - .625	3/4" - .75

5.02 FITTINGS

Fittings shall be cement mortar lined ductile iron and shall conform to AWWA C110. Ductile iron fittings shall have a minimum pressure rating of 350 psi. All water main fittings shall have mechanical joint ends in accordance with AWWA C111 and ANSI A21.11.

5.03 VALVES

Unless otherwise approved, in-line valves shall be located at not more than 600 foot intervals in all water mains.

Gate Valves - shall be manufactured in accordance with AWWA C500, and shall be double-disc, parallel seat, iron body, bronze mounted, non-rising stem and equipped with O'-ring stem seals. All valves on stub lines shall be equipped with retainer glands connected to a full section of pipe. All valves shall have D-150 mechanical joint ends in accordance with AWWA C111 and ANSI A21.11. All gaskets will be duck tipped unless pipe materials preclude their use. Valves shall have a 2" operating nut with extension if required. Valves shall open by turning counterclockwise (left).

Back flow Prevention Valves - Check valves, double check valve assemblies and reduced pressure back flow preventers preventing reverse flow shall be installed as required by the Plumbing Dept., Health Dept. or as specified by these Standards or if requested by the Authority's Engineer.

Combination Air Release and Vacuum Relief Valves - shall be installed at each high point on all water mains 12" in diameter and larger and at all other locations as directed by the Engineer. Air release and vacuum relief valves shall be located in precast concrete vaults in accordance with the details in this Document. They shall automatically release air from the lines when the lines are being filled with water, and shall admit air into the lines when water is being withdrawn in excess of the inflow. Valves shall be designed for a water working pressure of 125 psi, shall have stainless steel floats, and all working parts shall be brass, stainless steel, or other noncorrosive materials.

Pipe and fittings used in the valve system shall be galvanized steel, standard weight, and connections shall be threaded. Gate valves shall be bronze, threaded and shall have hand wheels.

5.04 VALVE BOXES

Valve boxes shall be cast iron, three (3) piece slip type with a 5-1/4" barrel. The cover shall indicate "WATER". The valve box shall not transmit shock or stress to the valves and shall be centered plumb over the wrench nut of the valve and the box cover shall be set flush with the surface of the finished grade. Valve boxes shall be TYLER Type No. 6860 or equal.

5.05 VALVE MARKER POSTS

Valve Marker Posts shall be installed where directed by the Authority's Engineer. Valve marker posts shall be 5' 6" tall Carsonite Composite Posts manufactured by AMET - Carsonite Division. The posts shall be driven 18" into the ground. Marker posts shall have decal indicating water valve.

5.06 VALVE STEM EXTENSIONS

In any location where a valve is installed on a water main with greater than 6 feet of cover over the top of the main, a valve stem extension will be installed on the operating nut. This extension shall bring the operating nut to within 4 feet of the ground surface. This extension will be as manufactured by the Bingham and Taylor Co. or approved equal.

5.07 FIRE HYDRANTS

Fire hydrants shall be Mueller Centurion # A-423 or approved equal. Fire hydrants shall conform to AWWA C502 and shall be installed in accordance with the detail. Hydrants shall have a 6" bell connection, two 2-1/2" hose connections and one 4-1/2" pumper connection. Threads on the pumper and hose connections shall conform to the "National Standard Screw Threads for Fire Hose Couplings and Fittings" published by the Insurance Services Office. Hydrants shall have a minimum of 5-1/4" main valve opening, and the operating nut shall be a pentagonal 1-1/2". They shall have a bronze coupling and bronze to bronze seating. They shall be designed to operate under 150 psi working pressure and shall open counterclockwise (left). Bury length shall be 5' 6". In areas where the depth of cover is greater than 5' the bury length shall be increased accordingly.

5.08 VAULTS AND MANHOLES

General - Vaults and manholes shall be installed as shown on the Standard Details and as directed by the Engineer. They may be either precast or cast-in-place concrete and shall be designed for AASHTO H-20 traffic loading. For cast-in-place vaults and manholes, design details must be submitted to and approved by the Engineer prior to start of construction. Precast manholes shall be constructed in accordance with ASTM C478. Unless otherwise specified, all concrete shall have a minimum 28-day compressive strength of 4000 psi.

All joints, pipe openings, or other places where infiltration could occur shall be sealed with K.T. Snyder "Ram-Nek" or other approved sealant.

Steps - shall be aluminum ALCOA No. 12653B or cast iron Neenah R-1980-J and shall be cast into the vault or manhole wall at the same time the vault or manhole section is cast. Steps shall be located as shown on the standard details and positioned to allow 18" minimum to 24" maximum spacing from the surface to the first step and 12" spacing thereafter.

Frames and Covers - The standard 24" diameter ring and cover shall be Number 1202B as manufactured by the Campbell Foundry or approved equal. Rings and covers for meter vaults shall be as specified on the details. "LTMUA WATER" shall be boldly cast onto all covers. All frames and covers shall be American made. Covers to receive at least two coats of asphaltic varnish. Covers are to be provided with non-penetrating pickholes.

5.09 BLOW-OFF HYDRANTS

Blow-off hydrants shall be Mueller Centurion # A-420 or A-423 as in accordance with the detail. Blow-off hydrants shall be installed at all dead ends, at any low points specified by the Engineer and at other locations as directed by the Engineer. Installation of blow-off assemblies shall be in accordance with the details.

5.10 TIE-RODS AND CLAMPS

Tie-rods and clamps shall be installed in accordance with the details on all vertical bends, fire hydrant runs, plugs, valves on stub lines, reducers and at other locations where required by the Engineer.

Where rodding is required, a minimum of one length of pipe shall be rodded either side of the fitting.

Buried tie-ropes and clamps shall be coated with two coats of coal tar epoxy paint for a total minimum thickness of 18 mills.

5.11 THRUST BLOCKS

Thrust blocks shall be installed in accordance with the details at all tees, plugs, bends, fire hydrants and at other locations where required by the Engineer. Concrete for thrust blocks shall have a minimum 28-day compressive strength of 3000 psi.

5.12 PIPELINE MARKER TAPE

All buried non-metallic pipelines or pipelines in areas where the pipeline location is not easily definable shall be marked with a 2" wide metallic-cored tape placed in the trench continuously 2' to 3' below finished grade. Locations requiring metallic-cored tape shall be defined at the time of drawing review by the Authority's Engineer. If however it is determined by the construction observer that the situation warrants the installation of marker tape he may so direct the Contractor.

5.13 POLYETHYLENE WRAPPING

Where corrosive soil conditions are encountered or where the pipeline is in proximity to any gas pipelines or other facilities which might have cathodic protection, polyethylene wrapping shall be installed around all cast or ductile iron pipe. In all circumstances polyethylene wrapping shall be installed around all fittings, valves, fire hydrant barrels, and rods and clamps. Polyethylene wrapping shall be in accordance with AWWA C105 and shall have a minimum 8 mil thickness.

A 2" wide 10 mil thickness of polyethylene pressure-sensitive tape shall be used to close seams or hold overlaps. Rips, punctures, or other damage to polyethylene wrapped pipe or fittings shall be repaired to the satisfaction of the Engineer.

5.14 CORPORATION STOP

Corporation stop shall be Mueller H 15000, copper service flared end connection outlet for copper service tubing or approved equal. Service connections must be suitable for use with 1" Type K copper service tubing meeting ASTM B 88 specifications.

5.15 CURB STOP

Curb stop shall be Mueller H-15204 Mark III Oriseal Valve or approved equal. Service flared end connection on the street side of the valve must be suitable for use with 1" Type K copper service tubing meeting ASTM B 88 specifications. The contractor must contact the property owner and determine the type of tubing connection to be utilized on the property owner's side of the curb stop and the exact location desired by the property owner along the front lot line. The cost of any other type or size of curb stop required to facilitate the connection of a different type of tubing will be borne by the applicant. Any other size of curb stop must be requested in writing by the applicant.

5.16 CURB BOX

Curb box shall be Mueller H-10314 with Mueller 87081 lid for 1" or 1-1/2" service connection and Tyler 6870 Box with drop lid marked water for 2" or larger connections.

SECTION 6 - MATERIALS FOR SEWER COLLECTION

6.01 PIPE

All materials included in this Specification shall conform to the latest editions of applicable ASTM, AWWA, ASA and ANSI Standards. Pipe classes indicated shall be considered minimums.

It shall be the responsibility of the Design Engineer to design the pipe system in accordance with the latest appropriate design standards and for the actual site conditions. Design will be supplied in the Engineer's Report and will be reviewed by the District Engineer as part of the drawing review process.

6.01.1 POLYVINYL CHLORIDE (PVC) SEWER PIPE

All PVC pipe furnished under this Specification shall be manufactured in strict accordance with ASTM D3034, DR35 for 4" through 15" diameter pipe. 18" and larger diameter pipe shall meet the requirements of ASTM F679 or UNI-BELL UNI-B-9.

All PVC laterals shall conform with ASTM Specification D-1785, Schedule 40.

Size of Pipe - This Specification shall cover all sizes of PVC pipe from 4" through 27" in diameter.

Joint Type - Joints shall be bell and spigot type employing an elastomeric ring gasket in accordance with ASTM D3212. The manufacturer's lubricant shall be applied to the spigot end to prevent damage to the ring and aid in providing a tight joint.

Laying Length - Nominal laying lengths shall vary according to the manufacturer.

Fittings - shall have the same structural qualities as the adjoining pipe.

6.01.2 DUCTILE IRON PIPE (DIP)

All ductile iron pipe furnished under this Specification shall be manufactured in strict accordance with ASA A21.51 and shall conform to the following additional requirements:

Size of Pipe - This specification shall cover all sizes of ductile iron pipe 36" in diameter and smaller.

Joint Type - Push-on joint single gasket or mechanical joint single gasket conforming to the requirements of ASA A21.11.

Thickness Class - Pipe shall be furnished with the following minimum thickness classes:

18" diameter and smaller - Class 52
18" - 36" diameter - Class 51

Laying Length - Pipe shall have a nominal laying length of 18 or 20 feet.

Grade of Iron - Iron used in the manufacture of pipe shall have 60/42/10 iron strength.

Protective Coatings - The surface finish of all pipe and fittings shall conform to the following:

Interior - Pipe and fittings shall have a polyethylene lining. This lining shall have a thickness of 40 mils (0.040 inch) nominal, 35 mils (0.035 inch) minimum. The lining shall be a blend of high-density and low-density polyethylene powders complying with ASTM D1248 compounded with an inert filler and carbon black to provide resistance to ultraviolet rays during storage above ground. Prior to preheating, 75% or more of the high temperature oxide film must be removed through proper preparation of pipe interior surface. Fitting shall be sandblasted. Pipe and fittings shall be uniformly preheated to a temperature adequate to provide uniform fusing of the polyethylene powders and proper bonding to the pipe and fittings. The lining at the ends shall be hermetically sealed and every pipe and fitting shall be subjected to and pass a 400 volt wet sponge, or equivalent, spark test. A sample cut from a production pipe shall pass the 4-hour boil adhesion test as describe din ASTM C-541. Pipe and fittings shall be U.S. Pipe's POLYLINED pipe and fittings or equal.

Exterior - Pipe and fittings shall have manufacturer's standard bituminous coating.

Fittings. Fittings shall be cast or ductile iron and shall conform to ASA A21.10. Joints for ductile iron fittings shall be mechanical joint conforming to ASA A21.11.

6.01.3 REINFORCED CONCRETE PIPE (RCP)

All reinforced concrete pipe furnished under this Specification shall be manufactured in strict accordance with ASTM C76, Class III, with a wall thickness not less than wall B.

Size of Pipe - This specification shall cover all sizes of reinforced concrete pipe larger than 24" in diameter.

Joint Type - Joints shall be bell and spigot type and shall conform to Section 7 of ASTM C361 except as modified herein.

Gaskets - shall have a circular cross section and shall be confined in a groove in the pipe spigot. Pipe with collars in lieu of integral bells will not be acceptable.

Each concrete pipe joint shall be designed to withstand, without cracking, the gasket compression plus a differential load across the joint equal to 4000 pounds per foot of internal diameter. Joint design details, including calculations, shall be submitted for review.

Gaskets shall conform to ASTM C361, Section 6.9.1. Polymer shall be neoprene or other synthetic rubber.

Laying Length - Except for fittings and closure pieces, pipe shall have nominal laying lengths not less than 7'6".

6.01.4 STEEL CASING PIPE (AWWA C200)

Smooth wall casing shall be of welded steel construction and shall be new material with a minimum yield point of 35,000 psi. The minimum thickness shall be in accordance with requirements of the regulatory agency, but shall in no case be less than the sizes indicated in the following Table. The casing pipe shall be cleaned and coated both inside and outside with coal tar epoxy paint meeting Specification C-200(A) or SSPC Paint 16. The casing pipe in its final position shall be straight and true in alignment and grade, and there shall be no space between the earth and casing.

Casing Size	Min. Casing Thickness With 1:4 Grout	Without Grout
a. 8" - 24"	3/8" - .375	1/2" - .5
b. 26" - 34"	1/2" - .5	5/8" - .625
c. 36" & Larger	5/8" - .625	3/4" - .75

6.02 FITTINGS

Fittings shall be furnished and installed at the locations and of type and size as shown on the approved plans.

All fittings shall have the same structural qualities and coatings as the adjoining type.

PVC Fittings - In general, PVC fittings shall be used for all PVC Pipe.

Ductile Iron Fittings - In general, ductile iron fittings shall be used for all ductile iron sanitary sewer mains. The fittings shall conform to ASA A21.10 and have a polyethylene lining. Joints shall conform to ASA A21.11.

Reinforced Concrete Pipe Fittings - shall have the same structural qualities as the adjoining pipe except as modified herein for bends.

At the option of the Contractor, bends for reinforced concrete pipe shall be fabricated from segments of a steel cylinder with mortar lining and reinforced concrete exterior covering or from segments of concrete pipe miter cut while the pipe is still green. The deflection angle between adjacent segments shall not exceed 30 degrees.

Steel cylinders for bends shall be at least USS 10 gauge and shall be lined with concrete or mortar at least 3/4" thick. Bends fabricated from steel cylinders shall be designed for the same three-edge bearing loads as the adjacent piping.

Bends fabricated form miter cut segments of green concrete pipe shall have the concrete removed from around the reinforcing steel as necessary, the steel shall be welded, and the concrete shall be replaced. After installation, the entire bend shall be encased in concrete. Concrete encasement shall be at least 8" thick all around and shall extend the full length of the bend.

Reinforcement. Circumferential reinforcement shall be full-circle type. Elliptical or part-circle reinforcement will not be acceptable. The total area of longitudinal steel shall be not less than 0.2% of the concrete cross-sectional area of the pipe. Longitudinal steel shall be spaced uniformly around the pipe and shall consist of at least eight (8) continuous or lap spliced wires or bars in each cage.

6.03 MANHOLES

General - Manholes shall be installed as shown on the Standard Details and as directed by the Engineer. Manholes may be either precast or cast-in-place concrete and shall be designed for AASHTO H-20 traffic loading. For cast-in-place manholes, design details must be submitted to and approved by the Engineer prior to start of construction. Precast manholes shall be constructed in accordance with ASTM C478. Unless otherwise specified, all concrete shall contain Type II cement and shall have a minimum 28-day compressive strength of 4000 psi.

Exterior Coating. Exterior of the manhole shall receive two coats of coal tar epoxy C-200(a) or SSPC - Pout 16 totaling 18 mills. The joints shall be parged and then receive the same coal tar epoxy coating for all joints to an elevation 4 feet above the ground water level.

Interior Coating. Manholes in general shall not receive an interior coating. Any manhole that has a drop connection, discharge of a force main of any size or a difference in pipe inverts greater than six inches (6") shall receive a coal tar epoxy coating similar to that of the exterior - all joints shall be parged and sealed.

Channel Coating. Channel shall be epoxy coated with two coats - 10 mil total of SIKAGARD 62 or approved equal.

Bench Coating. Benches shall receive two coats - 10 mil coating of SIKAGARD 62 at the same time as the channel. After benches and channel are dry (8-10 hours), the contractor shall give the benches only a third coat 4 mil thickness and spread coarse sand into the surface of the bench. Extreme care will be taken not to allow any of the granular material or additional coating from falling into the channel.

All PVC connections to manholes shall be sealed using a ribbed Kor-N-Seal 1 Assembly gasket as manufactured by National Pollution Control Systems Inc. or approved equal. Pouring the concrete manhole base directly around the plastic pipe will not be accepted.

Manhole Marker Post - shall be installed at the direction of the engineer whenever a manhole is located outside of a traveled street or walkway in accordance with the detail. Manhole Marker Post shall be similar to specification to Valve Marker Post. Manhole Marker Post shall be green with label indicating "Sanitary Sewer Manhole".

Base - shall be a minimum of 8" thick, and the overall outside dimension shall be 2 feet greater than the inside dimension of the manhole constructed thereon. The base shall be constructed of concrete composed of a mix of clean and well-graded aggregate ranging from sand to gravel 1-1/2" in maximum diameter. The mix shall contain 6 sacks of Type II cement to the cubic yard and only enough water shall be used to give it a slump test of 2". Air entrained in the mix when placed shall be between 3% and 5%. Cylinders taken from the mix shall in 28 days have not less than 3,500 pounds compressive strength per square inch. Reinforcing steel or wire mesh shall be in accordance with the standard details. The Contractor shall be responsible for taking and testing cylinders as required by the Engineer.

Steps - shall be aluminum ALCOA No. 12653B or cast iron, Neenah R-1980-J and shall be cast into the manhole wall at the same time the manhole section is cast. Steps shall be positioned to allow 18" minimum to 24" maximum spacing from the surface to the first step and 12" spacing thereafter.

Internal Drop Manhole Connection. Internal Drop Manhole Connections will be made in strict compliance with the specifications shown on the detail. Drop pipe shall extend 8/10th of the diameter of the influent pipe diameter above the invert of the influent pipe. Drop pipe to be bevel cut to fit under influent pipe. Drop pipe to be two inches larger in diameter than the influent pipe. Drop pipe to be held by stainless steel straps. Straps to be bolted to the manhole walls with stainless steel bolts and washers. Bolts must be removable. Drop pipe shall be rubber gasketed not solvent welded.

Internal drop connections made to existing sanitary sewer manholes will require the removal and replacement of the manhole invert unless the bench can be removed or repaired on the side of the drop connection to the satisfaction of the Authority's engineer. All inverts of existing manholes will require SIKAGARD 62 coating and internal walls will require 18 mil coal tar epoxy coating. Connection to the existing manhole shall be made by coring and sealed by Kor-N-Seal 1 Assembly as manufactured by National Pollution Control Systems Inc. or approved equal.

Frame and Cover. Standard frame and cover shall be 24 inch diameter Model 1202B as manufactured by the Campbell Foundry or approved equal. Covers to be provided with non-penetrating pick holes. Covers shall have the letters LTMUA cast in the cover in letters 2 inches high. All frames and covers shall receive two coats of asphaltum varnish. Where required to be watertight, the frame and cover shall be Model 1502 with a neoprene gasket as manufactured by the Campbell Foundry. Bolt down frames and covers where required shall be as specified by the Authority's engineer.

6.04 CLEANOUTS

Cleanouts shall not be installed in public streets unless so directed by the Engineer. All cleanouts shall be constructed as specified by the Engineer, and shall be installed in accordance with the detail on sewer service lines under the following guidelines:

(a) Cleanouts shall be installed at all changes in direction requiring bends.

(b) Not more than 100' of continuous sewer line shall be installed without at least one cleanout.

(c) Cleanouts shall be located such that all portions of the lines can be cleaned by rodding.

6.05 POLYETHYLENE WRAPPING

Whenever corrosive soils are encountered, polyethylene wrapping shall be installed around all cast or ductile iron pipe if so indicated on the Plans or if directed by the representative of the Authority's Engineer, or from the Authority. Polyethylene wrapping shall be in accordance with AWWA C105 and shall have a minimum 8 mil thickness.

A 2" wide 10 mil thickness of polyethylene pressure-sensitive tape shall be used to close seams or hold overlaps. Rips, punctures, or other damage to polyethylene wrapped pipe shall be repaired to the satisfaction of the Engineer.

SECTION 7 - REQUIREMENTS FOR CONSTRUCTION

7.01 COMMENCEMENT AND CONTINUATION OF CONSTRUCTION

Construction must commence within 9 months of the final approval of the plans. Failure to commence construction with 9 months or halting construction for 6 months will be grounds for revocation of the final approval. This will mean that the applicant will have to resubmit the plans for review and approval including new fees.

7.02 AVOIDANCE OF DELAY

The contractor shall make every attempt to have all materials, equipment and manpower on the job site that will be needed to complete the work. All delays in the project will increase the construction observation costs which must be paid for by the applicant. The contractor shall be responsible for notifying the applicant of all delays incurred.

7.03 INSPECTION

Installation of all new facilities in the Authority's service area shall be inspected and approved by an Inspector who is authorized by and working for the Authority.

The Inspector shall ensure that the provisions of these Standards are carefully complied with especially with regard to the quality of workmanship and materials. Problems which may require sound field judgment, in lieu of strict interpretation of the Engineering Standards, shall be resolved by the Designing Professional Engineer and the Contractor to the satisfaction of the Inspector.

The inspector shall have access to all work and shall arrange with the Contractor to be present during testing as well as any other phases of construction as the Inspector may deem necessary. Any work done in the absence of the Inspector, and buried in violation of his orders that it be left visible for inspection, shall be excavated for thorough inspection if so ordered by the Inspector. Any such excavation shall be at the expense of the Contractor.

All work shall be performed in accordance with accepted workmanship practices and these Standards. Any work not accepted by the Inspector shall be redone until compliance with these Standards is achieved. The Inspector shall not supervise nor set out work nor give line and grade stakes, nor shall he undertake any of the responsibilities of the Contractor, Subcontractors, or Contractor's Superintendent.

All appropriate permits and approval plans shall be on the job site and shall be checked by the Inspector before starting construction.

All materials used shall be subject to the inspection and approval of the Inspector at all times. The Inspector has the right to perform any testing deemed necessary to ensure compliance of the materials with these Standards. No material shall be used before being inspected and approved by the Inspector. Failure or neglect on the part of the Inspector to condemn or reject inferior materials, or work, shall not be construed to imply their acceptance should their inferiority become evident at any time prior to one year after final acceptance of the work. Materials rejected by the Inspector shall be immediately removed from the job site.

7.04 PRECONSTRUCTION MEETING

The Professional Engineer who has designed the main extension shall hold a preconstruction meeting to include at least the Contractor, Professional Engineer, Authority's Construction Observer, the Authority's Engineer and the Applicant. The purpose of the meeting shall be to discuss the construction project, scheduling and to define responsibilities for the personnel involved in the project. The design engineer shall take notes at the meeting and submit a memo to the Authority indicating all items discussed.

No work shall commence until the preconstruction meeting has been held and the installing contractor has an approved set of plans and specifications in his possession. All work shall be performed in strict compliance with the approved plans and specifications and shall be inspected and approved by the Authority.

Contractors performing all work in the District shall be competent, licensed firms with adequate manpower and equipment to accomplish the work in accordance with these Engineering Standards.

The contractor shall submit a detailed construction schedule to the Authority, Authority's Engineer and the Design Engineer prior to the preconstruction meeting. This construction schedule will clearly detail when the Authority's facilities will be installed.

7.05 NOTIFICATION OF AUTHORITY

The Contractor shall be responsible for notifying the Authority at least 48 hours prior to start of any construction. If work is suspended for any period of time after initial start-up, the Contractor must notify the Engineer 48 hours prior to re-start.

For water main extensions, the Authority shall be notified 24 hours prior, when necessary, to open or close any valves on the existing water system. Only Authority personnel are authorized to operate valves.

7.06 VERIFICATION OF EXISTING UTILITIES

The Contractor shall employ what ever means necessary to verify the location of all existing utilities that may be affected by the construction. This will include the excavation of test pits if required to verify locations of utilities or materials of utilities to be connected to. This must be done far enough in advance so as to allow changes in the Plans or materials required. The Authority and the Authority Engineer shall in all cases be held harmless for materials or locations of utilities that are different than those shown on the Plans.

7.07 NOTIFICATION OF SERVICE DISRUPTION

If it is necessary to shut down any portion(s) of the existing water system to make such connection, the Contractor will be responsible for notifying all users to be affected by water outage at least 24 hours prior to such outage. All existing water main valves shall be operated only by authorized District personnel. The duration of water outage to the existing customers shall be minimized and if directed by the Engineer, the Contractor shall provide temporary water supply to customers by means of tank trucks, temporary connections to charged facilities, etc. If any possibility of service outage is even remotely possible the Contractor must supply a written plan as to how customers will be provided temporary service. This plan must be approved by the Engineer. It shall be the Contractor's responsibility to have all materials required to implement the plan available to be on the site within two (2) hours of an emergency outage.

7.08 MAINTENANCE OF TRAFFIC

The Contractor is responsible for maintenance of traffic at all times. As stated earlier, all permits must be in place and all traffic control devices required for the project must be in place prior to the commencement of construction. The owner is responsible to see that a Traffic Control Plan has been approved by the Township's Traffic Control Officer and is implemented for the Project. If required, Flagmen and/or uniformed Traffic Control Officer(s) will be maintained at the site. If a Flagman is required, he shall be dedicated solely to the job of Flagman and not be burdened with other responsibilities of construction.

The Contractor shall be solely responsible for the safety precautions taken on the job site. If the Engineer or his representative feels that the site is unsafe, he can make recommendations to the Contractor to remedy the situation. If the situation is not rectified, the Engineer will notify the proper authorities and have them investigate the conditions and take appropriate action.

7.09 EXCAVATION

General - Excavation for pipelines, fittings and appurtenances shall be open trench to the depth and limits necessary for proper installation as shown on the approved drawings or as otherwise approved by the Engineer.

Tunneling may be permitted as indicated by economy of construction or necessity of preserving existing improvements. If the earth in the tunnel sloughs off, the roof shall be broken down, and the tunnel excavated as an open trench unless a grout injection plan is approved by the Authority's Engineer.

Limits of Excavation - Except as otherwise approved by the Engineer, the maximum length of open trench open at any time shall be 600 feet or the distance necessary to accommodate the amount of pipe installed in a single day, whichever is smaller.

Trench Width - Excavation and trenching shall be true to line so that the overall trench width from the bottom of the trench to 12" above the top of the pipe shall not be less than 24" nor more than 12" wider than the largest outside diameter of the pipe (outside diameter of bell on bell and spigot pipe) to be laid therein, exclusive of branches. Where the trench width is wider than the maximum set forth above, Class A bedding (arch encasement) shall be installed.

Trenching Methods - Hand methods for excavation shall be employed in locations where directed by the Engineer. In other locations, the Contractor may use motorized trench digging machinery.

Bracing Excavations - All excavations shall be performed, protected and supported as required for safety. As a minimum standard, the Contractor will abide by the operation rules, orders and regulations prescribed by the Occupational Safety and Health Administration Federal Register. All excavations shall be properly supported in the manner as required by State laws, municipal ordinances and as may be necessary to protect life, materials and property if conditions dictate. The lives and safety of the men must be the primary concern of the Contractor.

Excavations shall be so sheeted, shored and braced that the ground alongside the excavation will not slide or settle. The sheeting, shoring and bracing shall be so arranged as not to place any stress on portions of the completed work until the general construction thereof has proceeded far enough to provide ample strength.

Care shall be exercised in the removing of sheeting, shoring and bracing to prevent the caving or collapsing of the excavation faces which are being supported.

Grading and Stockpiling - The Contractor shall control grading in a manner to prevent water from running into excavations. Obstruction of surface drainage shall be avoided and means shall be provided whereby stormwater will remain uninterrupted in existing gutters. Other surface drains or temporary drains shall be provided by the Contractor.

Barricades - Barriers shall be placed at each end of all excavations and at such places as may be necessary along excavations to warn all pedestrian and vehicular traffic of such excavations. Lights shall also be placed along excavations from sunset each day to sunrise of the next day until such excavation is entirely stabilized and able to accept any anticipated traffic loads. All traffic regulatory devices shall be approved by the agency responsible for the roadway in question.

7.10 DEWATERING

The Contractor shall provide and maintain at all times during construction, ample means and devices with which to promptly remove and properly dispose of all water from any source entering the excavations or other parts of the work. Dewatering shall be accomplished by methods which will insure dry excavation and preservation of the bottoms of excavations. Said methods may include deep wells, well points, sump pumps, suitable rock or gravel placed below the required bedding for drainage and pumping purposes, temporary pipelines and other means, all subject to the approval of the Engineer.

The applicant is responsible for obtaining all permits and payment of all costs and fees associates with the dewatering procedure. Care must be taken during the construction process not to allow the water from entering into any work which has previously been completed.

Dewatering for the water lines shall commence when ground water is first encountered, and shall be continuous thereafter until the structure to be built or the pipe to be installed therein, is completed to the extent that no damage from hydrostatic pressure, flotation, inundation or other cause will result. At no point in time will installation of pipe be allowed in a situation where the pipe is in contact in any way with ground water. If during the installation of the facilities the Contractor allows water to enter the pipe being laid the Authority may require that all pipe installed be removed and cleaned prior to being reinstalled to assure the interior of the pipe is clean and free of silt or other debris.

The Contractor shall dispose of the water from the work in a suitable manner without damage to adjacent property or to new construction. Any damage which might occur must be restored within three (3) days of the occurrence to the satisfaction of the Authority, the Engineer and any other parties concerned.

7.11 BEDDING

General - Bedding procedures shall be in accordance with the details and as specified below. If excessively wet, soft, spongy, unstable or similarly unsuitable material is encountered at the grade upon which the bedding material is to be placed, the unsuitable material shall be removed to a depth as determined in the field by the Engineer, and the sub grade shall be brought to a level 6" below the pipe with such material as the Engineer may order installed to provide a firm foundation.

Where ledge rock, boulder and large stones are encountered, they shall be removed to provide a clearance of at least 6" below and around the pipe and fittings before backfilling to pipe grade.

Granular Bedding Material - shall be clean and well graded sand or 3/4" gravel and shall conform to the following gradation:

Well-Graded Sand

Sieve Size	Total % Passing by Weight
3/8 inch	100
No. 4	95 - 100
No. 8	80 - 100
No. 16	50 - 85
No. 30	25 - 60
No. 50	10 - 30
No. 100	2 - 10

3/4 Inch Gravel

Sieve Size	Total % Passing by Weight
3/4 inch	95
No. 4	0 - 5

Granular bedding material shall be placed in not more than 6 inch lifts and shall be compacted by slicing with a shovel or by hand operated mechanical vibrators.

Class A Bedding (Arch Encasement) - shall be defined as that method of bedding in which the upper half of the pipe is encased in concrete. It shall not be required unless improper trenching or unexpected trench conditions require its use as determined by the Engineer.

Class B Bedding - shall be defined as that method of bedding in which the pipe is set on compacted granular bedding material. Granular bedding material shall be placed and compacted under the pipe and around the sides of the pipe to springline. Class B bedding shall be required for all PVC pipe and as otherwise directed by the Engineer.

Class B Bedding Alternate - The same requirements shall apply as in Class B Bedding except that granular material shall be placed to a depth of 1' above the pipe. This may be used at the Contractor's option or shall be required by the Engineer if the Contractor fails the compaction test on the backfill material hand-placed to 1' above the pipe.

Class C Bedding - shall be defined as that method of bedding in which the pipe is set on compacted granular bedding material supporting the lower quadrant of the pipe barrel. The trench shall be excavated to a depth below the established grade equal to 1/8 of the outside pipe diameter, but not less than 4". Compacted granular material shall be placed under the pipe and around the sides of the pipe to a minimum of 1/6 of the outside pipe diameter from the bottom of the pipe barrel. Class C Bedding shall be required for ductile iron pipe.

Ground Water Barrier - Where required by the Engineer, continuity of bedding material shall be interrupted by low permeability ground water barriers to impede passage of water through the embedment. Barrier material shall meet soil classifications GC, SC, CL, or ML- CL, and shall be compacted to 95% of maximum density as determined by ASTM D698. Material may be finely divided suitable job excavated material, free from stones, organic matter and debris. Barriers shall be compacted soil the full depth of granular material, the full trench width, and approximately 4' long.

7.12 INSTALLATION OF PIPE

General - Pipe shall be installed in accordance with the manufacturers recommendations and these specifications.

7.12.1 ALIGNMENT AND GRADE

All facilities shall be accurately surveyed and staked by a firm familiar with this type of work. If requested, the contractor will supply the inspector with the cut sheets for the facilities to be installed. If the contractor fails to produce cut sheets or, in the inspector's opinion, the lines have not been adequately staked, or the stakes have been destroyed, the inspector may direct the contractor to cease the operation until such time as he can prove to the inspector that the facilities are being installed to the proper alignment and grade as shown on the approved plans.

Whenever obstructions not shown on the approved plans are encountered during the progress of the work and interfere to such an extent that an alteration in the Plans is required, the design Engineer shall be the only individual with authority to change the plans and order a deviation from any line and/or grade. The design Engineer shall be responsible for maintaining the intent of the approved plans. Any deviation from the plans found unacceptable by the Authority or the Authority's Engineer shall be revised at no cost to the Authority. All deviations to the approved plans shall be brought to the attention of the Authority's Engineer as soon as possible. The design Engineer may require the construction to halt until he can discuss the modifications with the Authority's Engineer or other professionals to determine a course of action to correct the problem. The Authority and the Authority's Engineer shall be held harmless for any costs associated with the delay or postponement of construction.

Waterlines - shall be laid to the required lines and grades as shown on the approved Plans and in such a manner as to form a close concentric joint with the adjoining pipe and prevent sudden offsets of the line.

Unless otherwise required to avoid conflict with other utilities, all water mains will have at least 5' for cover over the pipe. Any locations having less than 5 feet of cover must be approved by the Authority's Engineer. These locations may require insulation of the pipe.

Where possible, vertical deflections shall be made at pipe joints and vertical bends shall be eliminated. Whenever it is necessary to deflect the pipe from a straight vertical or horizontal line, whether to avoid obstructions, plumb stems or construct long-radius curves, the amount of deflection shall not exceed the maximum limits recommended by the manufacturer.

All attempts should be made to eliminate localized high points in any water mains. If the Contractor is laying water main uphill and approaches a crossing requiring extra depth he should begin deflecting the pipe early enough to carry it level until such time as it can cross under the obstruction and then be brought back up to the 5' minimum depth of cover.

Sewer Lines - The sewer line shall be laid to the required lines and grades as shown on the approved plans and in such a manner as to form a close concentric joint with the adjoining pipe. No offsets of the line are permitted.

Installation of curvilinear sewers or sewers with breaks in grade other than at manholes is strictly forbidden. The sanitary sewer should be installed utilizing laser equipment specifically constructed for the installation of sanitary sewers. This does not preclude the Contractor from control of the alignment and grade of the sanitary sewer by other means. However, if the Authority's Engineer believes, for any reason, that the sanitary sewer may have a problem with alignment or grade he can require that the line be televised at no cost to the Authority.

After televising the line a copy of the tape must be brought to the Authority Engineer's office. The Authority's Engineer, after reviewing the tape will suggest a course of action which may include but not be limited to:

(1) Removal and replacement of the line.

(2) Payment of a cash fee sufficient to pay for maintenance of the line from the interest accrued.

(3) Extension of the Maintenance Guarantee. Televising of the line at some future date to release the Guarantee.

(4) Acceptance of the line.

7.12.2 MATERIAL INSPECTION BEFORE INSTALLATION

The Contractor shall allow for sufficient time for the Engineer's representative to inspect all pipe and fittings for cracks and other defects while suspended and before installation. Spigot ends shall be examined with particular care as this area is the most vulnerable to damage from handling. Defective pipe or fittings shall be laid aside for inspection by the Engineer, who will prescribe corrective repairs or rejection. Materials rejected shall be marked and removed from the job site.

The Engineer reserves the right to reject any and all pipe sections that may contain visual imperfections or imperfections of any type that may be considered by the Engineer as detrimental to the operation and life of the pipe whether or not the pipe may pass any testing procedure or if it is certified.

7.12.3 PREPARATION FOR INSTALLATION

The interior of all pipe and fittings shall be kept thoroughly clean before installation and shall be kept clean until the work has been accepted. All joint contact surfaces shall be kept clean until the joint is completed.

Every precaution shall be taken to prevent foreign material from entering the pipe during installation. If the pipe laying crew cannot lower the pipe into the trench and place it without getting earth into it, the Engineer may require that before lowering the pipe, tightly woven heavy canvas bags or plastic caps be placed over each end and left there until the connection is made to the adjacent pipe. No debris, tools, clothing or other materials shall be placed in the pipe.

At all times when pipe laying is not in progress, the open end of the pipe shall be closed with a tight fitting cap or plug to prevent the entrance of foreign matter into the pipe. These provisions shall apply during the noon hour, if construction is temporarily halted, as well as overnight.

7.12.4 LOWERING OF MATERIALS INTO TRENCH

Proper tools and equipment satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient performance of the work. Materials shall be carefully lowered into the trench one piece at a time. This shall be done in such a manner as to prevent damage to the material, protective coatings and linings. Under no circumstance shall any materials be dropped into the trench.

If damage occurs to any material during handling, or if it is discovered the materials have been dropped into the trench, the Contractor shall mark the material as defective and remove that material from the site by the end of the work day.

7.12.5 CUTTING OF PIPE

The cutting of pipe for inserting fittings or other appurtenances shall be done in a neat and workmanlike manner without damage to the structural integrity of the pipe, coating or the lining so as to leave a smooth end at right angles to the axis of the pipe. All tools used in cutting pipe shall be approved by the Engineer.

Power-driven saws with abrasive discs (masonry blades) shall not be used for dry cutting or beveling asbestos-cement pipe. In recognition of efforts to reduce the incidence and corresponding danger of airborne asbestos fibers, MOA PVC pipe may be used in place of MOA asbestos-cement pipe wherever cutting is necessary.

7.12.6 DIRECTION OF LAYING

Pipe shall be laid with the bell or coupling ends facing in the direction of laying, unless otherwise specified by the Engineer. Where the pipe is laid on a grade of ten percent (10%) or greater, the laying shall proceed upward with the bell or coupling ends of the pipe upgrade if the progression of work allows.

7.12.7 ASSEMBLY OF PIPE AND FITTINGS

Mechanical Joint. Mechanical joints shall be carefully assembled in accordance with the manufacturer's recommendations. If effective sealing is not obtained, the joint shall be disassembled, thoroughly cleaned and reassembled. Over tightening bolts to compensate for poor installation practices will not be permitted.

The holes in mechanical joints with tie rods shall be carefully aligned to permit installation of the tie rods. The Authority allows the use of Super Star Tie Bolts as manufactured by Star National Products, to assist in the rodding of mechanical joint fittings where required. In flange and mechanical joint pieces, holes in the mechanical joint bells and the flanges shall straddle the top (or side for vertical piping) centerline. The top (or side) centerline shall be marked on each flange and mechanical joint piece by the manufacturer.

Push-On-Joint. The pipe manufacturer's instructions and recommendations for proper jointing operations shall be followed. All joint surfaces shall be lubricated with heavy vegetable soap solution immediately before the joint is completed. Lubricant shall be suitable for use in potable water as recommended by the pipe manufacturer, shall be stored in closed containers and shall be kept clean. Each spigot end shall be suitably beveled to facilitate assembly. If the lubricant becomes contaminated with any foreign material the Contractor will immediately discard the contaminated lubricant.

7.13 PIPE ENCASEMENT

Concrete Encasement. The utility shall be encased in concrete wherever shown on the Plans or as directed by the Engineer. All concrete encasement shall be reinforced in accordance with the Standard Encasement Detail and shall be of sufficient length as to span the condition encountered.

7.14 TRENCH BACKFILLING AND COMPACTION

All trenches shall be backfilled after pipe, fittings and appurtenances have been installed, inspected and approved by the Engineer. The backfill shall be compacted in not more than 12" lifts by vibrating, tamping, or a combination thereof, to 70% relative density for sand material as determined by ASTM D2049, or to 95% of maximum density for cohesive soils as determined by ASTM D698. A minimum of one test per lift per 600' of line of pipe installed shall be taken by the Contractor.

It is expected that the trench excavation will provide suitable backfill material. Wet, soft or frozen material, asphalt chunks or other deleterious substances shall not be used for backfill. If the excavated material is not suitable for backfill, suitable material shall be hauled in and utilized, and the rejected material hauled away and disposed of properly. All backfill material shall be subject to the approval of the Engineer.

Compaction tests shall be taken by a certified testing laboratory at locations designated by the Engineer. Copies of test results will be mailed to the Engineer. In all cases where the tests indicate compaction less than that required in these specifications, additional compaction and tests will be required until these specifications are met. Final acceptance of the lines by the Authority will be contingent upon satisfactory compaction results. Final testing of the water main will not be allowed until satisfactory compaction is obtained.

7.15 TEMPORARY RESTORATION

If final restoration is not anticipated to be completed within one week of backfilling the trench then temporary restoration of the area should be completed within three (3) days of completion of the installation. The Contractor is required to determine if the governing Authority for the roadways has a more strict regulation regarding the restoration of the paved areas.

Paved Areas. Temporary restoration should consist of a minimum 6" of stabilized base course.

Landscaped Areas.

7.16 PIPE TESTING AFTER INSTALLATION

7.16.1 TESTING PROCEDURES

General. All lines will be tested by the Contractor prior to restoration of pavement. These test will not need to be witnessed by the Authority's Engineer unless the applicant wishes to operate the lines prior to final acceptance. If the applicant does wish to utilize the facilities prior to final acceptance then the representative of the Authority must witness all tests.

No facilities shall be tested for final acceptance until all restoration is completed over the facilities. This will include all grading and seeding, landscaping and pavement restoration. No facilities shall be tested until all other underground utilities have been installed to include gas, electric, irrigation, cable and telephone. The Contractor must request the tests to be witness 48 hours in advance.

7.16.2 WATER

Hydrostatic Pressure Test - All sections of newly laid pipe shall be subjected to a hydrostatic pressure test as soon as the thrust blocks are adequately cured. The hydrostatic test pressure shall be 150 pounds per square inch. This pressure will be maintained during the duration of the test. Unless specifically modified by the information presented in this Section, the Contractor shall abide by all procedures and precautions for hydrostatic testing as specified in AWWA C600-82.

Before applying the specified test pressure, all air shall be expelled from the pipe. If permanent air vents are not located at all high points, the Contractor shall install corporation cocks at such points so the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and test pressure applied. Any cracked or defective material including but not limited to pipe, fittings, valves or hydrants discovered as a consequence of this pressure test shall be removed and replaced by the Contractor and the test shall be repeated until results satisfactory to the Authority's Engineer are obtained. Duration shall be at least one (1) hour for each test.

Each valved section of the pipe shall be slowly filled with water and the specified test pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Authority's Engineer. The pump, pipe connection, gauges and all other necessary equipment and personnel to complete the test, shall be furnished by the Contractor, accurately calibrated and shall be approved by the Engineer. All corporation cocks and taps to the main line and all connection piping and valves that may be required to make the test, whether or not specified or shown on the construction drawings, shall be installed by the Contractor. The Authority's Engineer shall witness all pressure tests. At least forty-eight (48) hours notice shall be given by the Contractor to the Engineer prior to making the test.

Leakage Test - A leakage test shall be conducted concurrently with the hydrostatic test.

The Contractor shall furnish the pump, pipe, connections, meters and other necessary apparatus to conduct the test under the supervision of the Authority'sEngineer. The equipment shall be accurately calibrated and shall be approved by the Authority's Engineer. The duration of such leakage test shall be one (1) hour, and during the test the main shall be tested to a minimum pressure of 150 psi.

Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain the specified leakage test pressure after the air in the pipeline has been expelled and the pipe has been filled with water. The pipe installation will not be accepted if the leakage is greater than that indicated in Table 6 of AWWA Specification C 600-82. This Table is included in the Detail Section of these Standards.

If any test of laid pipe discloses leakage greater than that specified, the Contractor shall locate and repair the defective area or areas until the leakage is within the specified allowance.

7.16.3 SANITARY SEWER

Air Testing. Air testing must be used in lieu of exfiltration testing for PVC sewer pipe, but not for reinforced concrete sewer pipe. Air testing shall comply with ASTM C828. Reinforced concrete pipe shall be tested by means of an infiltration or exfiltration test. Procedures for air testing shall be submitted to the Authority's Engineer for review before testing is started.

Leakage shall not exceed 0.003 cfm per square foot of internal pipe wall at an average pressure of 3 psi. The time elapsed for a one psi drop in air pressure shall not be less than:

$t = 0.472d$; where: t = time in minutes
d = pipe diameter in inches

Leaks shall be located by air testing short sections of pipe. Leaks shall be repaired and the reach of sewer retested.

Infiltration. If, in the construction of a section of the sewer between structures, excessive ground water is encountered, the test for exfiltration shall not be used, but instead, the end of the sewer at the upper structure shall be closed sufficiently to prevent the entrance of water, and pumping of ground water shall be discontinued for at least three days after which the section shall be tested for infiltration. The infiltration shall not exceed 200 gallons per day per inch of diameter per mile of sewer being tested and does not include the length of service laterals entering that section. Where any infiltration in excess of this amount is discovered before completion and acceptance of the sewer, the sewer shall be immediately uncovered and the amount of infiltration reduced to a quantity within the specified amount of infiltration before the sewer is accepted. Even if, however, the infiltration is less than the specified amount, the Contractor shall stop any individual leaks that may be observed when ordered to do so by the Authority's Engineer. The Contractor shall furnish all labor and materials for making the tests required. All preliminary tests must be completed before street or trench is resurfaced, unless otherwise directed by the Engineer.

ALLOWABLE LIMITS OF INFILTRATION FOR MANHOLE STRUCTURES

DIAMETER OF MANHOLE (INCHES)	INFILTRATION GAL/VERTICAL FT./HR.
48	0.08
60	0.10

Exfiltration. An exfiltration test shall be conducted on each reach of sewer between manholes. The first line between manholes shall be tested before backfilling and before any sewer pipe is installed in the remainder of the work. Thereafter, exfiltration testing shall be done after backfilling and individual or multiple reaches may be tested at the option of the Contractor.

Exfiltration tests shall be conducted by closing the lower end of the sewer pipe to be tested and the inlet sewer pipe of the upper structure with plugs or stoppers and filling the pipe with water to a point 4' above the invert in the pipe at the upper structure, or to a height of 10' above the invert of the sewer pipe in the lower structure, whichever gives the least hydrostatic pressure on the lower structure.

The total exfiltration shall not exceed 250 gallons per day per inch of nominal diameter of pipe per mile of sewer pipe for each reach tested. The length of service connections shall not be used in computing the length of sewer pipe being tested. The exfiltration tests shall be maintained on each reach for at least two hours and as much longer as necessary, in the opinion of the Authority's Engineer, to locate all leaks.

The Contractor shall provide all necessary piping between the reach to be tested and the source of water supply, together with equipment and materials required for the tests. The methods used and the time of conducting exfiltration tests shall be acceptable to the Authority's Engineer.

Deflection. All PVC sewer pipe shall be checked for excessive deflection after backfilling is complete and prior to acceptance of the installation. All PVC sewers shall be tested by pulling a mandrel through the pipe, or by other methods acceptable to the Authority's Engineer. Pipe with diametral deflection exceeding 5% of the inside diameter shall be uncovered, the bedding and backfill replaced to prevent excessive deflection, and the pipe retested. Unless specific approval is given the deflection should not be performed until thirty (30) days after the backfilling and compaction of the trench.

TABLE 69

ASTM BASE INSIDE DIAMETERS
7 1/2 % DEFLECTION MANDREL DIMENSIONS
MODIFIED TO ADD 5 % MANDREL DIMENSIONS

Nominal Size, In.	Base Inside Diameter, In.	7 1/2 % deflection Mandrel	5 % Deflection Mandrel
6	5.742	5.31	5.455
8	7.665	7.09	7.282
10	9.563	8.84	9.085
12	11.361	10.51	10.793
15	13.898	12.86	13.203

NOTE: Base I.D. is a pipe I.D. derived by subtracting a statistical tolerance package from the pipe's average I.D. The tolerance package is defined as the square root of the sum of the squared standard manufacturing tolerances.

$$\text{Avg I.D.} = \text{Avg O.D.} - 2(1.06)\,t$$

$$\text{Tolerance Package} = (A^2 + B^2 + C^2)^{\frac{1}{2}}$$

Where:

A = OD tolerance (ASTM D3034), in.
B = excess wall thickness tolerance = 0.06t, in.
C = out-of-roundness tolerance
t = minimum wall thickness (ASTM D3034), in.

In preparation of the recommended base inside diameter values presented in Table 69 tolerances were established and accommodated in accordance with accepted practice. The outside diameter tolerance (A) was taken from Table 1 in ASTM D3034. The wall thickness tolerance (B) is the customary 12% of minimum wall or 0.020 inch, whichever is greater (as done in other ASTM plastic pipe standards). The out-of-roundness tolerance (C) was derived statistically from field measurement data collected by ASTM members and appears in tabular form in Appendix XI of ASTM D3034-81. The base inside diameter was established by subtracting a statistically derived tolerance package from the PVC sewer pipe's average inside diameter. The tolerance package was derived by calculating the square root of the sum of the squared standard manufacturing tolerances. (See Uni-Bell's Deflection Technical Report, UNI-TR-1).

Using the same methodology, base inside diameters have also been developed for DR 35 PVC pipe manufactured in accordance with ASTM F679. (Refer to Table 70). Out-of-roundness values for ASTM F679 product were extrapolated form the ASTM D-3034-81 values.

TABLE 70

BASE INSIDE DIAMETERS
AND 7 1/2 % DEFLECTION MANDREL DIMENSIONS FOR ASTM F679 PIPE
AMENDED TO INCLUDE 5 % DEFLECTION MANDREL DIMENSIONS

Nominal Size, In.	Base Inside Diameter, In.	7 1/2 % deflection Mandrel	5 % Deflection Mandrel
18	16.976	15.70	16.13
21	20.004	18.50	19.00
24	22.480	20.80	21.36
27	25.327	23.44	24.06

7.17 GENERAL SITE CONDITIONS

The site shall be maintained free and clear of debris at all times. The Contractor must store material and deposit excavated material in a manner that will not obstruct the work nor endanger the workmen, obstruct vehicular or pedestrian traffic or access to any structure. The site should be graded smooth and left in a neat and presentable condition each evening so as not to cause a hazard.

7.18 RESPONSIBILITY TO REPAIR

Prior to trenching operations, the Contractor shall notify the Owner(s) in writing whose existing above ground or underground utilities are within 10 feet of trenching operations. Should any such utility be damaged in the trenching operations, the Contractor shall immediately notify the Owner of the utility, and unless authorized in writing by the Owner of the utility, the Contractor shall not attempt to make repairs. Duplicate copies of any written authorization given to the Contractor to make repairs shall be filed with the Authority's Engineer and shall be so worded as to save harmless the Authority or the Authority Engineer or the owner of the utility of any responsibility whatsoever relative to the sufficiency of the repairs.

In the event that during construction it is determined that any underground utility conduit, including sewers, water mains, gas mains and drainage structures, and any above ground utility facilities are required to be relocated, the Contractor shall notify the utility Owner(s) well in advance of his approach to such utility so that arrangements with the Owner(s) of the affected utility can be completed without delay to the work.

7.19 AS-BUILT INFORMATION

The Contractor is responsible also for gathering and maintaining field as-built information and pertinent drawings to include all distances between valves and fittings, all changes, and all important notes. Final acceptance of the lines by the Authority will be contingent upon the receipt of said as-built information to include certification of the as-built plans by the Contractor. The as-built plans must meet all requirements of the Authority. If the Authority or the Authority's Engineer requests copies of the as-built drawings during the progress of the project the Contractor must be able to supply as-built information withion ten (10) days of the request for that information.

7.20 MAINTENANCE FACILITIES

The Contractor will be held responsible for the proper functioning of the lines for a minimum of one (1) year from the date of probationary acceptance of the lines by the Authority. Any malfunction during this period of guarantee shall be remedied by the Contractor to the satisfaction of the Authority.

7.21 DISINFECTING WATER MAINS

General. This standard presents essential procedures for disinfecting new and repaired water mains. All new water mains shall be disinfected before they are placed in service. All water mains taken out of service for inspecting, repairing, or other activity that might lead to contamination of water shall be disinfected before they are returned to service. All work will be in accordance with AWWA C651 - 86 "Disinfecting Water Mains".

Record of Compliance. The record of compliance shall be the bacteriological test results certifying the water sampled from the water main to be free of coliform bacteria contamination.

Procedure. The Contractor will follow basic disinfection procedures. The basic disinfection procedure consists of:

(1) Preventing contaminating materials from entering the water main during storage, construction, or repair.

(2) Removing, by flushing or other means, those materials that may have entered the water main.

(3) Chlorinating any residual contamination that may remain, and flushing the chlorinated water from the main.

(4) Determining the bacteriological quality by laboratory test after disinfection.

Keeping Pipe Clean and Dry. Precautions shall be taken to protect the interiors of pipes, fittings, and valves against contamination. Pipe delivered for construction shall be strung so as to minimize entrance of foreign material. All openings in the pipeline shall be closed with watertight plugs when pipe laying is stopped at the close of the day's work or for other reasons, such as rest breaks or meal periods. Rodent-proof plugs may be used where it is determined that watertight plugs are not practicable and where thorough cleaning will be performed by flushing or other means.

Delay in placement of delivered pipe invites contamination. The more closely the rate of delivery is correlated to the rate of pipe laying, the less likelihood of contamination.

Joints of all pipe in the trench shall be completed before work is stopped. If water accumulates in the trench, the plugs shall remain in place until the trench is dry.

Sealing Materials. No contaminated material or any material capable of supporting growth of microorganisms shall be used for sealing joints. Sealing material or gaskets shall be handled in a manner that avoids contamination. The lubricant used in the installation of sealing gaskets shall be suitable for use in potable water. It shall be delivered to the job in closed containers and shall be kept clean. Any container which becomes contaminated will be disposed of immediately.

Cleaning and Swabbing. If dirt enters the pipe, and in the opinion of the Authority's Engineer or job superintendent the dirt will not be removed by the flushing operation, the interior of the pipe shall be cleaned by mechanical means and then shall be swabbed with a 1 percent (1%) hyprochlorite disinfecting solution. Cleaning with the use of a pig, swab, or "go-level" should be undertaken only when the owner's engineer or job superintendent has determined that such operation will not force mud or debris into pipe-joint spaces.

Wet-Trench Repairs. If it is not possible to keep the pipe and fittings dry during installation, every effort shall be made to assure that any of the water that may enter the pipe-joint spaces contains an available-chlorine concentration of approximately 25 mg/L. This may be accomplished by adding calcium hypochlorite granules or tablets to each length of pipe before it is lowered into a wet trench, or by treating the trench water with hypochlorite tablets. This procedure will not be allowed for new construction. This only pertains to emergency procedures where the Authority feels it is more dangerous to keep the service disrupted then to wait for dewatering. This decision must be approved by the Executive Director, Chief Operator or the Authority's Consulting Engineer.

Accidental Inundation During Construction. If the main is inundated by floodwaters during construction, it shall be cleared of the flood water by draining and flushing with potable water until he main is clean. The section exposed to the flood water shall then be filled with a chlorinated potable water that, at the end of a 24-h holding period, will have as free chlorine residual of not less than 25 mg/L. The chlorinated water may then be drained for flushed from the main. After construction is completed, the main shall be disinfected using the continuous-feed or slug method described in AWWA C651-86.

7.21.1 METHOD OF CHLORINATION

Tablet Method. The tablet method consists of placing calcium hypochlorite granules and tablets in the water main as it is being installed and filling the main with potable water when installation is completed.

Placing of Calcium Hypochlorite Granules. During construction, calcium hypochlorite granules shall be placed at the upstream end of the first section of pipe, at the upstream end of each branch main, and at 500 ft. intervals. The quantity of granules shall be as shown in Table 1.

Table 1 - Ounces of Calcium Hypochlorite Granules to be Placed at Beginning of Main and at Each 500 ft Interval.

Pipe Diameter	Calcium Hypochlorite Granules (oz)
4	0.5
6	1.0
8	2.0
12	4.0
6 and larger	8.0

Placing of Calcium Hypochlorite Tablets. During construction, 5-g calcium hypochlorite tablets shall be placed in each section of pipe and also one such tablet shall be placed in each hydrant, hydrant, branch, and other appurtenance. The number of 5-g tablets required for each pipe section shall be 0.0012d L rounded to the next higher integer, where d is the inside pipe diameter, in inches, and L is the length of the pipe section, in feet. Table 2 shows the number of tablets required for commonly used sizes of pipe. The tablets shall be attached by an adhesive such as Permatex No. 1* or equal. There shall be no adhesive on the tablet

except on the broad side attached to the surface of the pipe. Attach all the tablets inside and at the top of the main, with approximately equal numbers of tablets at each end of a given pipe length. If the tablets are attached before the pipe section is placed in the trench, their position shall be marked on the section so it can be readily determined that the pipe is installed with the tablets at the top.

TABLE 2

Number of 5g Calcium Hypochlorite Tablets Required for Dose of 25mg/L *

Pipe Diameter in	Length of Pipe Section ft				
	13 or less	18	20	30	40
	Number of 5g Calcium Hypochlorite Tablets				
4	1	1	1	1	1
6	1	1	1	2	2
8	1	2	2	3	4
10	2	3	3	4	5
12	3	4	4	6	7
16	4	6	7	10	13

* Based on 3.25 g available chlorine per tablet; any portion of tablet rounded to next higher number.

Filling and Contact. When installation has been completed, the main shall be filled with water at a rate such that water within the main will flow at a velocity no greater than 1 ft/s. Precautions shall be taken to assure that air pockets are eliminated. This Water shall remain in the pipe for at least 24 hours. If the water temperature is less than 41 degrees F (5 degrees C), the water shall remain in the pipe for at least 48 hours. Valves shall be positioned so that the strong chlorine solution in the treated main will not flow into water mains in active service.

7.21.2 FINAL FLUSHING

Clearing the Main of Heavily Chlorinated Water. After the applicable retention period, heavily chlorinated water should not remain in prolonged contact with pipe. In order to prevent damage to the pipe lining or corrosion damage to the pipe itself, the heavily chlorinated water shall be flushed from the main until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the system or is acceptable for domestic use.

Disposing of Heavily Chlorinated Water. The environment to which the chlorinated water is to be discharged shall be inspected. If there is any question that the chlorinated discharge will cause damage to the environment, then a reducing agent shall be applied to the water to be wasted to neutralize thoroughly the chlorine residual remaining in the water. (See Appendix B of AWWA C651-86) for neutralizing chemicals). Where necessary, federal, state, and local regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water.

7.21.3 BACTERIOLOGICAL TESTS

Standard Conditions. After final flushing and before the water main is placed in service, a sample or samples witnessed by a representative of the Engineer shall be collected from the end of the line, shall be tested for bacteriological quality in accordance with "Standard Methods for the Examination of Water and Wastewater", and shall show the absence of coliform organisms. A standard plate count may be required at the option of the Engineer. At least one sample shall be collected from the new main and one from each branch. In case of extremely long mains, it is desirable that samples be collected along the length of the line at lest every two thousand (2000) feet as well as at its end.

Special Conditions. If, during construction, trench water has entered the main, or if in the opinion of the owner's Engineer or job superintendent, excessive quantities of dirt or debris have entered the main, bacteriological samples shall be taken at intervals of approximately 200 ft. and shall be identified by location. Samples shall be taken of water that has stood in the main for at least 16 hours after final flushing has been completed.

Sampling Procedure. Samples for bacteriological analysis shall be collected in sterile bottles treated with sodium thiosulfate as required by "Standard Methods for the Examination of Water and Wastewater". No hose or fire hydrant shall be used in collection of samples. A suggested combination blowoff and sampling tap as shown in AWWA C651-86 is recommended to be constructed. A corporation cock may be installed in the main with a copper tube gooseneck assembly. After samples have been collected, the gooseneck assembly may be removed and retained for future use.

7.21.4 REDISINFECTION

If the initial disinfection fails to produce satisfactory bacteriological samples, the main may be reflushed and shall be resampled. If check samples show the presence of coliform organisms, then the main shall be rechlorinated by the slug method of chlorination until satisfactory results are obtained.

NOTE: High velocities in the existing system, resulting from flushing the new main, may disturb sediment that has accumulated in the existing mains. When check samples are taken, it is well to sample water entering the new main.

7.21.5 DISINFECTION FOR REPAIRS TO EXISTING MAINS

The following procedures apply primarily when mains are wholly or partially dewatered. After the appropriate procedures have been completed, the main may be returned to service prior to completion of bacteriological testing in order to minimize the time customers are out of water. Leaks or breaks that are repaired with clamping devices while the mains remain full of pressurized water present little danger of contamination require no disinfection.

Trench Treatment. When an old main is opened, either by accident or by design, the excavation will likely be wet and may be badly contaminated. Liberal quantities of hypochlorite must be applied to open trench areas to lessen the danger from such pollution. Tablets are used because they dissolve slowly and continue to release hypochlorite as water is pumped from the excavation.

Swabbing with Hypochlorite Solution. The interiors of all pipe and fittings (particularly couplings and sleeves) used in making the repair shall be swabbed or sprayed with a 1 percent hypochlorite solution before they are installed.

Flushing. Thorough flushing is the most practical means of removing contamination introduced during repairs. If valve and hydrant locations permit, flushing toward the work location from both directions is recommended. Flushing shall be started as soon as the repairs are completed and shall be continued until discolored water and any heavily chlorinated water is eliminated.

Slug Chlorination. Where practical, in addition to the procedures above, a section of main in which the break is located shall be isolated, all service connections shut off, and the section flushed and chlorinated as described in Section 5.3 of AWWA C651-86 "Disinfecting Watermains", except that the dose may be increased to as much as 300 mg/L and the contact time reduced to as little as 15 minutes. After chlorination, flushing shall be resumed and continued until discolored water is eliminated and the water is free of noticeable chlorine odor.

Sampling. Bacteriological samples shall be taken after repairs are completed to provide a record for determining the procedure's effectiveness. If the direction of flow is unknown, samples shall be taken on each side of the main break. If positive bacteriological samples are recorded, the situation shall be evaluated by a qualified Engineer who can determine corrective action, and daily sampling shall be continued until two consecutive negative samples are recorded.

7.21.6 PROCEDURE FOR TAPPING SLEEVES

Before a tapping sleeve is installed, the exterior of the main to be tapped shall be thoroughly cleaned, and the interior surface of the sleeve shall be lightly dusted with calcium hypochlorite powder.

Tapping sleeves are used to avoid shutting down the main to be tapped. After the tap is made, it is impossible to disinfect the annulus without shutting down the main and removing the sleeve. The space between the tapping sleeve and the tapped pipe is normally 1/2 inch, more or less, so that as little as 100 mg of calcium hypochlorite powder per square foot will provide a chlorine concentration of over 50 mg/L.

Adopted December 3, 1996
LTMUA Meeting

RULE

Every application for approval that includes or should include the abandonment of existing structures, including but not limited to reservoirs, basins, dams, canals, aqueducts, standpipes, conduits, pipelines, mains, pumping and ventilating stations, treatment, purification and filtration plants or works, trunk, intercepting and outlet sewers, water distribution systems, waterworks, wells, and their appurtenances, shall include:

1. An abandonment plan adhering to sound engineering principles that will reasonably protect the integrity of the operative water and sewer systems and the safety of the public; and

2. Performance guarantees to secure completion of the abandonment plan within a set time. The amount of the guarantee and the time for completion shall be determined by the Authority engineer.

TOTAL P. 01

SECTION 3

3.04 GENERAL REQUIREMENTS FOR WATER LATERAL

Materials for Water Laterals
Add to this Section

5] Back Flow preventers - All fire service lines shall have back flow preventers installed. They shall be reduced pressure type back flow perventers approved by the Authority engineer.

SECTION 5

5.03 VALVES

Back Flow Prevention Valves

This entire section to be removed and replaced with the Following - italics

All back flow prevention valves shall be the reduced pressure type.

RESOLUTION NO. 94-22

WHEREAS, the Executive Director, attorney and engineer have recommended the adoption of the following amendments to the Rules and Regulations of the Authority in order to reflect the hiring of a full-time-in-house engineer:

IT IS NOW in this 15th day of August, 1994, resolved by the Lakewood Township Municipal Utilities Authority as follows:

Section 1.12.2 of the Rules and Regulations of the Authority entitled, "Definitions", specifically subsections (f), (g), (h) and (i) are hereby amended to read as follows:

(f) Engineer: The Authority Engineer employed directly by the Authority or a consulting firm appointed by the Authority to represent the Authority. Also any representative of the engineer designated by the engineer to perform the duties of the engineer for the Authority.

(g) Engineering Fees: The fees for the engineer's services calculated by the multiplying the number of hours spent by the engineer by the hourly fee as stipulated on the Engineering Fee Schedule adopted by the Authority.

(h) Attorney's Fees: The fees for the attorney's services calculated by multiplying the number of hours spent by the attorney by the hourly fees as stipulated on the Attorney's Fee Schedule adopted by the Authority.

(i) Review Fees: Any fees or expenses for a project which will include but not be limited to engineering fees, attorney fees, construction observation fees, laboratory analysis or consultant's fees.

IT IS FURTHER resolved that the Executive Director shall issue a supplement to all copies of the Rules and Regulations in possession of the Authority and to any parties who have subscribed to them.

GEORGE J. HOFFMAN
Executive Director, LTMUA

I hereby certify that the foregoing resolution was duly adopted at the regular meeting of the Lakewood Township Municipal Utilities Authority on this 15th day of August, 1994.

JOYCE LEE CANNING
Secretary, LTMUA