

# City of Valdosta Land Development Regulations

## Chapter 332 Infrastructure and Site Improvements

### Article 3 Public Utilities Installation

#### Section 332-31 Water Supply and Sanitary Sewage

- (A) Applicability. This section shall apply to all current and potential users of the City of Valdosta Water and Sewer System including users outside the City who, by contract or agreement with the City, utilize the services of the City of Valdosta Water and Sewer System. Except as otherwise provided herein, the City Engineer shall administer, implement and enforce the provisions of the section.
- (B) Objectives
- (1) Provide a clear and concise description of the City of Valdosta Water and Sewer System standards for water and sanitary sewer system design and construction.
  - (2) Provide guidance to developers and their engineers to facilitate compliance with said standards.
  - (3) Furnish standards, which will create development of a quality water and sanitary sewer infrastructure.
- (C) Service Requirements
- (1) At the conceptual stage of a project, the owner/developer will submit a request to the City Engineer of the availability of water and sewer capacity for the project. The request should include, but not be limited to, the location of the project, the size of the development, and the type of service.
  - (2) The owner/developer shall identify the immediate needs for services as well as ultimate needs based on information made available from the City Engineer and other city agencies/departments/divisions.
  - (3) City Engineer shall evaluate the impact of the requested service upon the water distribution system and the sewer system and shall make a determination regarding the availability of services.
  - (4) For all new developments, Fire Flow tests are required, in accordance with Section 332-31(E)(2) below. The developer should have the results of the test prior to starting the construction plans.
- (D) General Design Criteria
- (1) *Line Extension Requirements*
    - (a) If it is required to extend a water main for a development, the developer must extend it the full length of the property's improved frontage. The size of the extension will be at least the size of the existing main and may be larger as directed by the City of Valdosta Water and Sewer System Master Plan or fire protection requirements.
    - (b) Developers are required to extend sanitary sewer service to their proposed development if the development can be connected to existing sewer by gravity flow and no further construction of planned sewers by the City of Valdosta downstream of the proposed development is anticipated. The diameter of the extension will be at least 8" or larger as directed by the City Engineer. In the latter case, the City of Valdosta will pay for upsizing.
    - (c) Sanitary sewer must be extended through a proposed development as necessary to serve future development upstream of the development boundary.

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- (d) If an existing water main or sanitary sewer line must be extended to serve a particular development, the developer would be required to pay all initial costs for the extension. Under some circumstances, the developer may be eligible to recover portions of the costs from future developers in the area in accordance with any city adopted sewer extension policies in effect at the time.
  - (e) Construction of dry sewer and septic tanks may be required under some circumstances if construction of planned sewers by the City of Valdosta downstream of the proposed development is anticipated.
- (2) *Street Cuts*
- (a) All major street crossings should be bored and cased per City of Valdosta Engineering and Georgia DOT.
  - (b) If a bore cannot be made, the City of Valdosta Engineering or Georgia DOT must permit the street cut.
- (3) *Standard Design and Construction Details.* Installation of water mains and related water appurtenances, sanitary sewer lines, and related sewer appurtenances shall be in accordance with applicable City of Valdosta Standard Design and Construction Details in Appendix H.
- (4) *Cased Bores*
- (a) For water line installations, manufactured casing spacers will be used to maintain proper line and grade of the carrier pipe. Spacer spacing shall not exceed 10 feet on center. Spacers shall be equal to Model 4810 stainless steel Casing Chocks as manufactured by Power Seal or equal.
  - (b) For installations involving gravity sewer lines, manufactured casing spacers will be used to maintain proper line and grade of the carrier pipe. Spacer spacing will not exceed 10 feet on center. Spacers will be equal to Model 4810 stainless steel Casing Chocks as manufactured by Power Seal or equal.
- (5) *Easements.* Provision of all easements needed for project development is the responsibility of the applicant. Easements not on the property being developed (off-site easements) should be reviewed by the City Engineer prior to execution by the underlying property owner. The easement instrument should be drawn between the underlying property owner and the applicant, and should provide for transfer of the permanent easement from the applicant to the City of Valdosta only upon acceptance of the installation by the City of Valdosta. The easement instrument should make it clear that the City of Valdosta is not responsible for completion of any work elements included as conditions to the easement (stipulations or otherwise).
- (6) *Quit Claims.* In the event that the City of Valdosta holds a valid easement (either utilized or not utilized) that might interfere with development of a project, the City of Valdosta is willing to consider abandoning its rights with regard to the easement if the easement is currently unused and not reasonably expected to be used, or if the piping in the easement is satisfactorily relocated and easements for the new alignment provided. Quit claims must be approved by the Mayor and City Council. If needed, the quit claim process should be initiated as early as possible in a project as several months are normally required to complete the required research, review, and execution.
- (7) *Requirements for Sewer Capacity Study.* In the event that the City Engineer determines that the wastewater generated by a proposed development may result in surcharge or overflow of the sewer system, the City Engineer may require that a sewer capacity study be provided by the developer. The scope of the study will be determined by the City Engineer on the basis of the specific situation, but may include flow monitoring, internal inspection, survey of grades, calculation of capacities, projection of future flows, or to other elements. As a result of this

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study, the developer may be required to upsize downstream facilities, enter into an agreement to participate in the cost of upsizing downstream facilities, or contribute to the cost of future improvements.

## (E) Water

- (1) Applicability. To provide adequate water flow and pressure to the citizens of the City of Valdosta for domestic usage and fire protection as outlined in the City of Valdosta Water and Sewer System Master Plan.
- (2) Design Criteria and Standards
  - (a) Fire Flow Test
    - i. A Fire Flow Test must be conducted on the existing water line, for any new development, prior to submitting design drawings for approvals, to determine the adequacy of water supply for the project. Utilization of a Fire Flow Test by more than one project is prohibited.
    - ii. The test shall consist of a fire hydrant flow test and a 6-hour pressure test.
    - iii. Test information furnished by the developer's engineer or sprinkler system design consultant shall be furnished to the City Engineer, shall be certified, and shall consist of:
      1. Static pressure and GPM Flow
      2. Residual Pressure and GPM flow
      3. Projected flow in GPMs @ 20 p.s.i.
      4. Actual Pressure flow in GPM
  - (b) Site Map Including Fire Hydrant Locations
    - i. Fire flow test results must be included in the water plans prior to approval of the plan by the Water System. The City Engineer may require a 24-hour pressure chart recording. Fire flow test must not be more than six (6) months old at the time of first submittal to the City Engineer.
    - ii. Water supply must meet fire flow and domestic requirements for service area. If adequate supplies are not available, construction will be contingent upon approval of a design study and plan submitted by the owner.
  - (c) Fire Flow Requirements Minimum flow in gallons per minute at 20 p.s.i. by the duration in minutes by type of development is required to be as follows:
    - i. In C-H, M-1, and M-2 zoning districts: 1,000 GPM for 30 minutes
    - ii. In all other zoning districts: 750 GPM for 30 minutes
  - (d) Spacing of Fire Hydrants
    - i. In the C-H, M-1, and M-2 zoning districts and for any facility which handles or uses flammable or hazardous materials, hydrants shall be installed within 300 feet to the mid-point of the structure and equally spaced thereafter, not to exceed 500 feet between hydrants and the extreme rear of the building. The distance shall be measured along the line traveled by the fire truck. When automatic sprinklers are installed according to N.F.P.A. requirements, the spacing of hydrants may be increased from 300 feet to 500 feet.
    - ii. In the R-M, R-P, MXD, O-P, C-N, C-C, C-D, and C-A zoning districts, fire hydrants shall be installed so that the distance from fire hydrants to the driveway entrance nearest the front of the building shall not exceed 250 feet, with a total distance not to

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exceed 500 feet to the extreme back of the building by way of driveways. If automatic sprinklers are installed according to N.F.P.A. regulations, the spacing of hydrants may be increased to 350 feet to the driveway entrance nearest the front of the building, provided the total distance does not exceed 700 feet to the extreme back of the building by way of driveways.

- iii. In the E-R, R-E, R-25, R-15, R-10, R-6, R-I, CSD and TND zoning districts developments shall have a maximum fire hydrant distance of 500 feet from the hydrant to the most distant building served by that hydrant.
- (e) Location of Fire Hydrants
- i. Fire Hydrants on City Streets: Fire hydrants on existing City streets shall be located between the edge of the right-of-way and the water lines.
  - ii. Fire Hydrants on New Streets: Fire hydrants on new streets shall be located between the edge of the right-of-way and the water lines along the property line.
- (f) Painting of Fire Hydrants. All hydrants shall be painted silver as needed. Reflective tape a minimum of 1" wide shall be placed around the entire circumference of the bonnet with the ends overlapping a minimum of 1". White reflective tape shall be used on all public fire hydrants. Orange reflective tape shall be used on all fire hydrants that are not owned and/or maintained by City of Valdosta Water and Sewer System. Painted tape or worn tape shall be replaced.
- (g) Fire Main Size
- i. Water mains serving single-family residential development shall be a minimum of 6",
  - ii. Water mains serving all other types of development shall be a minimum of 8".
- (h) Location of Water Mains and Appurtenances
- i. Existing City Streets: On existing city streets, water lines shall be located 2 feet from the edge of pavement with a minimum cover of 48".
  - ii. Water Lines on New Streets: Water lines in new streets shall be located 5 feet from the back of the curb with a minimum depth of 48".
  - iii. Service for All New Developments: Dual water feed required for developments greater than 40 residential units, with more than 1,500 linear feet of water line, where adequate flows otherwise unavailable, or where special circumstances dictate same in the opinion of the City Engineer.
  - iv. Service Laterals: Service laterals shall be located as per City of Valdosta Standard Design and Construction Details, Appendix E, with a minimum depth of 42" within the right-of-way and shallowing to a depth of 18" at the water meter location.
  - v. Water Meters: Water meters shall be located at the edge of the street right-of-way or utility easement per City of Valdosta Standard Design and Construction Details, Appendix E, and permanently marked in the curb with a brass/aluminum marker with an embossed one-inch "W." Orbital forged aluminum concrete marker RC1/RC02 or equal.
  - vi. Water Valves: Water valves at intersections shall be located as per City of Valdosta Standard Design and Construction Details, Appendix E. Valve location shall be permanently marked in the curb with a brass/aluminum marker with an embossed one inch "V". Orbital forged aluminum concrete marker RC1/RC02 or equal.
  - vii. Dead-end Lines: A gate valve and a minimum of two restrained joints of pipe, mechanical joint cap or plug rodded to a concrete thrust collar shall be provided at the end of all lines where extension is proposed or anticipated for phased developments.

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- viii. Connections to Existing Water Mains: Wet-tap assembly connections shall be allowed for size on size connections to existing water mains with 48-hour minimum notice to the City of Valdosta Engineering Department.

## (F) Water Inspection

- (1) Hydrostatic pressure and leakage tests shall be performed on all water mains. The contractor shall furnish oil-filled gauges, pressure pumps, and other equipment needed to test the line. The pressure gauge used for testing shall be laboratory calibrated suitable for the test pressure required.
- (2) The pressure required for the field hydrostatic pressure test shall be 150 psi or the pressure class of the pipe, whichever is greater. The contractor shall provide temporary plugs and blocking necessary to maintain the required test pressure. Corporation cocks at least ¾ inches in diameter, pipe riser, and angle globe valves may be required at each pipe dead-end and high point in order to bleed air from the line. Duration of the pressure test shall be at least 6 hours. The cost of these items shall be included as a part of the testing.
- (3) A record of successful pressure testing results will be provided by the contractor to the City Engineer at the time of the observing the leakage testing.
- (4) The leakage test shall be a separate test at the maximum operating pressure as determined by the owner following the pressure test and shall be of not less than 2 hours duration. All exposed pipes, fittings, valves, and joints will be carefully examined during the tests and all leaks evident at the surface shall be repaired and retested as necessary until test requirements are complied with. Defective materials, pipes, valves, and accessories shall be removed and replaced. The amount of leakage allowed shall not be greater than one gallon per inch of diameter pipe per one hundred foot in a twenty-four hour period.
- (5) Chlorination: All newly installed lines greater than ten feet in length shall be chlorinated per AWWA standards.

## (G) Sewer

- (1) Applicability. To furnish sanitary sewer service to all new developments within the City of Valdosta in accordance with the City of Valdosta Water and Wastewater System Master Plan.
- (2) Design Criteria and Standards
  - (a) System Design
    - i. Sewer system should be designed for the estimated tributary population. Tributary population is considered to be all areas upstream of the discharge point of the system being designed. Sewers will be designed to the uppermost property line of the development being served.
    - ii. New sewer systems shall be designed to accommodate peaked sewage flow plus anticipated maximum infiltration/inflow levels under open channel flow conditions. The pipe diameter and slope shall be selected to obtain the greatest practical velocities to minimize settling problems.
  - (b) Design Standards
    - i. No sanitary sewer collector less than 8" in diameter may be installed. Service laterals in the public right-of-way or sewer easement shall be at least 6" in diameter and shall terminate with a cleanout assembly. Service lateral locations shall be permanently marked in the curb with a brass/aluminum marker with an embossed 1" "S", Orbital forged aluminum concrete marker RC1/RC02 or equal, and installed by the developer according to the approved Detail entitled "Sewer Service Lateral" in City of Valdosta Standard Design and Construction Details, Appendix E. Manhole

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spacing should not exceed 400 LF. Variance to exceed these lengths shall be documented and submitted for review by the City Engineer.

- ii. Sanitary sewer easements shall be a minimum of 20 feet wide.
- iii. No permanent structures shall be constructed within 10 feet of the edge of a permanent easement on front and rear setbacks or within 2 feet on side setbacks.
- iv. Depth of sanitary sewer lines should not exceed 18 feet and a maximum of 25 feet off-ROW. Variance to exceed these “depths” shall be documented and submitted for review by the City Engineer.
- v. Manholes below the 100 year flood elevations will have bolt-down, water-tight rings and covers pre-cast into the manhole cone.
- vi. All man-hole adjusting rings used on manholes in the streets will be metal.
- vii. All utility manholes on right-of-way will be flush with the ground elevation.
- viii. Manhole joints shall be sealed with an approved sealant to prevent infiltration and inflow.
- ix. Drop connections of proper design are required at all manholes where the drop is greater than 2½ feet.
- x. All manholes shall be stabilized with a minimum of 6” of crushed stone under the base, if required.
- xi. Minimum angle between influent and effluent sanitary sewer lines at a manhole shall be 90°.
- xii. The maximum allowable slope for a sanitary sewer line shall be 20%. All sewers greater than 15% in slope shall be DIP with appropriate restraints. The minimum allowable slope for a sanitary sewer line (8” diameter) is 0.4%; however, greater slopes are preferable. Sanitary sewer systems should be designed to maximize carrying capacity by making the smallest slope utilized in the system is as large as possible.
- xiii. Ductile iron pipe shall be required under the following circumstances:
  1. When a sanitary sewer line has a cover of less than 3 feet.
  2. When a sanitary sewer line crosses a storm sewer line with less than 2 feet of clearance.
  3. When a sanitary sewer line passes laterally within one foot of a storm sewer line.
  4. When a sanitary sewer line is to have in excess of 10 feet of fill.
  5. When a sanitary sewer line is less than 6 feet under a street.
  6. When a sanitary sewer line crosses a creek.
  7. All drop connections in manholes unless otherwise approved by the City Engineer.
  8. When a sanitary sewer line is located such that there is a possibility of a setback encroachment from a future structure.
- xiv. When practical, when DIP is required, it should be used the entire length between manholes to avoid transition couplings. However, rigid PVC transition couplings may be used using HARCO, Specified Fittings, Inc., or equal adaptors.
- xv. Both vertical and horizontal alignments shall be reviewed with the City Engineer prior to finalization.

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xvi. All oil and grease, water, and solids separators (grease traps) required in this provision shall have a capacity and design in compliance with the following equations:

1. Restaurants:  $(S) \times (20) \times HR / (12) \times (LF) = \text{Capacity in Gallons}$

S = Number of seats in dining area

HR = Number of hours open

LF = Loading Factor – 1.25 Interstate Highways

Other Freeways

Recreational Areas, Shopping Centers

0.80 Main Highways

1.00 Otherwise

2. Hospitals, nursing homes, other type commercial kitchens with varied seating capacity:

$(M) \times (5) \times (LF) = \text{Capacity in Gallons}$

M = Meals per day

LF = Loading Factor – 1.0 with dishwasher / .05 without dishwasher

a. Except that no grease trap shall be smaller than 750 gallons, no single separator shall be larger than 3,000 gallons. Where requirements exceed 3,000 gallons, multiple units shall be used. In cases of certain fast food restaurants or establishments with a potential to discharge large quantities of grease and oil, capacity requirements greater than 20 gallons per seat may be required. Pre-packaged or manufactured grease traps may be approved by the control authority with proper engineering and application review.

b. For restaurants, other eating establishments, or commercial food preparation establishments: All grease interceptors shall be exterior (except as noted below) and shall be sized in accordance with City of Valdosta Standard Design and Construction Details, Appendix . Active Interior Recovery devices may be allowed with City Engineer approval for existing buildings (where installation of an exterior trap is impractical) or in conjunction with “tenant finish” permits (excepting the downstream tenant in a multiuse building) when sizing requirements are established and certified by a plumbing engineer and with the owner’s acknowledgement that an upgrade to an exterior trap may be required if the units fails to comply with the maximum grease discharge limit of 150 milligrams per liter, or if the owner’s establishment causes a sewer manhole overflow (or “spill”).

3. Shopping Centers, Mixed Use Developments:

a. For developments where restaurants or food service establishments are expected but specific users or franchises are not yet identified, exterior traps are to be pre-installed and sized for each user at 1,000 gallons for the first 46 seats and 500 additional gallons for each additional 23 seats (or portion thereof). All exterior grease traps will comply with the City of Valdosta Standard Design and Construction Details, Appendix E.

b. Thoroughly tamped, compacted, granular bedding material is required for all gravity sanitary sewer pipe installations. This bedding shall be a minimum of six (6) inches below the pipe and extend up to the mid-point (springline) of

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the pipe for the full trench width. The remainder of the pipe shall be covered with compacted select material to at least one foot above the pipe.

## (c) Sewer Inspection

- i. The contractor shall air test all gravity sewer lines following completion of construction and pipe cleaning. PVC pipe must also pass a 5% deflection test. Contractor shall furnish all necessary equipment and materials for testing.
- ii. Infiltration Tests: Use only when groundwater is two feet above the top of the pipe.
  1. Install suitable weirs in manholes selected by the Engineer to determine the leakage of ground water into the sewer. The maximum length of line for each infiltration test shall be 1,000 feet. Measure leakage only when all visible leaks have been repaired and the ground water is two feet above the top of the pipe. If leakage in any section of the sewer line exceeds 100 gdp/inch diameter/mile, locate and repair leaks. Repair methods must be approved by the Engineer. After repairs are completed, re-test for leakage.
  2. Furnish, install, and remove the necessary weirs, plugs, and bulkheads required to perform the leakage tests. Where continuous monitoring of flow level is required, the Owner will provide and operate monitoring equipment.
- iii. Exfiltration Tests: Choose one of the following when groundwater is not two feet above the top of the pipe.
  1. Hydrostatic Test
    - a. Test pipe between manholes with a minimum of 10 feet hydrostatic pressure, measured at the center of the pipe at the upstream manhole.
    - b. The ends of the pipe in the test section shall be closed with suitable watertight bulkheads. Inserted into the top of each bulkhead shall be a 2" pipe nipple with an elbow. At the upper end of the test section, a 12" riser pipe shall be connected to the 2" nipple. The test section of pipe shall be filled through the pipe connection in the lower bulkhead which shall be fitted with a valve, until all air is exhausted and until water overflows the riser pipe at the upper end. Water may be introduced into the pipe 24 hours prior to the test period to allow complete saturation. House service lines, if installed, shall also be fitted with suitable bulkheads having provisions for release of air while the test section is being filled with water.
    - c. During the test period, which shall extend over a period of two hours, water shall be introduced into the riser pipe from measured containers at such intervals as are necessary to maintain the water level at the top of the riser pipe. The total volume of water added during the test period shall not exceed that specified for infiltration.
  2. Low-Pressure Air Test
    - a. Prior to air testing, the section of sewer between manholes shall be thoroughly cleaned and wetted. Immediately after cleaning or while the pipe is water soaked, the sewer shall be tested with low-pressure air. At the Contractor's option, sewers may be tested in lengths between manholes or in short sections (25 feet or less) using inflatable balls pulled through the line from manhole to manhole. Air shall be slowly supplied to the plugged sewer section until internal air pressure reaches approximately 4.0 psi. After this pressure is reached and the pressure allowed to stabilize (approximately two to five minutes), the pressure may be reduced to 3.5 psi before starting the



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test. If a 1.0 psi drop does not occur within the test time, then the line has passed the test. If the pressure drops more than 1.0 psi during the test time, the line is presumed to have failed the test, and the Contractor will be required to locate the failure, make necessary repairs, and retest the line. Minimum test time for various pipe sizes, in accordance with ASTM C 828 is as follows:

<b>Normal Pipe Size, inches</b>	<b>T (Time Min/100 feet)</b>
8	1.2
12	1.8
15 & 16	2.1

- b. Required test equipment, including inflatable balls, braces, air hose, air source, timer, rotameter as applicable, cut-off valves, pressure reducing valve, 0-15 psi pressure gauge, 0-5 psi pressure gauge with gradations in 0.1 psi and accuracy of  $\pm$  two percent, shall be provided by the Contractor. Testing equipment shall be equal to Cherne Air-Loc Testing Systems.
- c. The Contractor shall keep records of all tests made. Copy of such records will be given to the Engineer or the Owner. Such records shall show date, line number and stations, operator, and such other pertinent information as required by the Engineer.
- d. The Contractor is cautioned to observe proper safety precautions in performance of the air testing. It is imperative that plugs be properly secured and that care be exercised in their removal. Every precaution shall be taken to avoid the possibility of over-pressurizing the sewer line.
- iv. PVC Deflection Test: Test PVC gravity sewer for excessive deflection by passing a "pig" through the line with a diameter equal to 95 percent of the nominal inside diameter of the pipe. Excavate and install properly any section of pipe not passing this test. Re-test until results are satisfactory. This test shall be performed within the first 30 days of installation and during final inspection, at the completion of this contract.
- v. If the test fails to meet the infiltration, air or deflection test requirements, the contractor shall determine, either using TV or video, the source(s) of leakage or deflection, make necessary repairs, and retest the test section, all at no additional cost to owner.
- vi. A record of the low-pressure air and deflection testing will be provided to the City of Valdosta inspector at the final sewer construction inspection. The record should include the line segment identification, initial air pressure, time interval allowed, the final air pressure, deflection test log, date of tests, and name of the person in charge of testing.
- vii. At the time of the final sewer construction inspection, the newly installed sewer system will be separated from the existing system by installing plugs in accordance with City of Valdosta Water and Sewer System standard operating procedures. These plugs will remain in place until the successful completion of the post paving inspection and will only be removed under authorization of the City of Valdosta inspector.

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- viii. For all sewer segments with slopes less than 1%, the contractor shall be required to verify the actual grades in the presence of a City of Valdosta inspector either prior to or during the construction final inspection, or prior to the placement of stone base in streets/paved area.
- ix. Manhole testing. Prior to testing manholes for watertightness, all liftholes shall be plugged with a non-shrink grout, all joints between precast sections shall be properly sealed and pipe openings shall be temporarily plugged and properly braced. Each manhole shall pass one of the following tests:
  - 1. Exfiltration Tests: The manhole, after proper preparation as noted above, shall be filled with water. The maximum allowable leakage shall be eight gallons per foot of depth per 24 hours for 48" diameter manholes. Tests shall last a minimum of eight hours. The manholes may be backfilled prior to testing.
  - 2. Vacuum Tests: The manhole, after proper preparation as noted above, shall be vacuum tested prior to backfilling. The test head shall be placed at the inside of the top of the cone section and the compression head inflated to 40 psi to effect a seal between the vacuum base and the manhole structure. Connect the vacuum pump to the outlet port with the valve open. A vacuum of 10" of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to 9". The manhole shall pass if the time is greater than 60 seconds for 48" diameter manholes. If the manhole fails the initial test, necessary repairs shall be made with non-shrink grout while the vacuum is still being drawn. Retesting shall proceed until a satisfactory test is obtained. Vacuum testing equipment shall be equal to that as manufactured by P.A. Glazier, Inc.

## (3) Sewer and Water Installation

- (a) Lay all pipe and fittings to accurately conform to the lines and grades established by the Engineer.
- (b) Pipe Installation
  - i. Proper implements, tools and facilities shall be provided for the safe performance of the Work. All pipe, fittings and valves shall be lowered carefully into the trench by means of slings, ropes or other suitable tools or equipment in such a manner as to prevent damage to sewer materials and protective coatings and linings. Under no circumstances shall sewer materials be dropped or dumped into the trench.
  - ii. All pipe, fittings, valves and other appurtenances shall be examined carefully for damage and other defects immediately before installation. Defective materials shall be marked and held for inspection by the Engineer, who may prescribe corrective repairs or reject the materials.
  - iii. All lumps, blisters and excess coating shall be removed from the socket and plain ends of each pipe, and the outside of the plain end of the inside of the bell shall be wiped clean and dry and free from dirt, sand, grit or any foreign materials before the pipe is laid. No pipe which contains dirt shall be laid.
  - iv. Foreign material shall be prevented from entering the pipe while it is being placed in the trench. No debris, tools, clothing or other materials shall be placed in the pipe at any time.
  - v. As each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. The pipe shall be secured in place with approved backfill material.

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- vi. It is common practice to lay pipe with the bells facing the direction in which work is progressing, however, it is not mandatory.
  - vii. Applying pressure to the top of the pipe, such as with a backhoe bucket, to lower the pipe to the proper elevation or grade shall be permitted.
  - viii. Detection tape shall be buried 4 to 10" deep. Should detection tape need to be installed deeper, the Contractor shall provide 3" wide tape. In no case shall detection tape be buried greater than 20" from the finish grade surface.
- (c) Alignment and Gradient.
- i. Lay pipe straight in alignment and gradient.
  - ii. Maintain a transit, level and accessories on the job to lay out angles.
  - iii. The Contractor shall check the invert elevation at each manhole and the pipe invert elevation at least three times daily, start, mid-day and end of day. Elevations shall be checked more frequently if more than 100 feet of pipe is installed in a day or if the pipe is being constructed at minimum slope.
  - iv. The Contractor shall check the horizontal alignment of the sewer at the same schedule as for invert elevations.
- (d) Expediting of Work: Excavate, lay the pipe, and backfill as closely together as possible. Do not leave unjointed pipe in the trench overnight. Backfill and compact the trench as soon as possible after laying and jointing is completed. Cover the exposed end of the installed pipe each day at the close of work and at all other times when work is not in progress. If necessary to backfill over the end of an uncompleted pipe or accessory, close the end with a suitable plug, either push-on, mechanical joint, or restrained joint or as approved by the Engineer.
- (e) Joint Assembly
- i. Push-on, flanged and mechanical type joints shall be assembled in accordance with the manufacturer's recommendations.
  - ii. Each restrained joint shall be inspected by the Contractor to ensure that it has been "homed" 100%.
- (f) Cutting Pipe
- i. Cut ductile iron pipe using an abrasive wheel saw.
  - ii. Cut PVC pipe using a suitable saw.
  - iii. Remove all burrs and smooth the end before jointing.
  - iv. The Contractor shall cut the pipe and bevel the end, as necessary, to provide the correct length of pipe necessary for installing the fittings, valves, accessories and closure pieces in the correct location. Only push-on and mechanical joint pipe shall be cut.

## Section 332-32 Communication Distribution Systems

All communication distribution systems installed within the property limits of a development shall be placed underground. The plans submitted to the City Engineer will set forth the anticipated location of all underground installations. Incidental communication terminal boxes may be placed above ground.

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## Section 332-33 Electric Power Distribution Systems

All electric distribution systems of 25,000 volts or less phase to phase installed within the property limits of a development shall be placed underground. The plans submitted to the City Engineer will set forth the anticipated location of all underground installations.

## Section 332-34. Underground Installation Feasibility Criteria

The following criteria will be used to determine whether or not underground installation is feasible. When installation is determined to be not feasible for either economic or technical reasons, the City Engineer may authorize overhead installation following receipt of documented reasons as to why underground installation is not feasible in accordance with Section 332-34(B)(1) or 332-34(B)(2).

### (A) Communications Distribution Systems

- (1) Economic Feasibility: Underground installation of electric facilities shall be deemed to be feasible if the cost to the utility is reasonably competitive to aerial construction.
- (2) Technical Feasibility: In the absence of a showing that terrain, soil conditions, limited space, and other factors prevent proper installation and/or operation of underground facilities, underground facilities, undergrounding shall be deemed technically feasible.

### (B) Electric Power Distribution Systems

- (1) Economic Feasibility - Underground installation of electric facilities shall be deemed to be feasible if the charge levied by the utility on the developer, pursuant to a uniform policy of the utility or policy established by order of the Georgia Public Service Commission, is equal to or less than 25% of the cost borne by the utility in establishing such service.
- (2) Technical Feasibility - In the absence of a showing that terrain, soil conditions, or other factors preventing proper installation and/or operation of undergrounding shall be deemed technically feasible.

## Section 332-35 through Section 332-40      *Reserved*