DESOTO COUNTY

UTILITY DEPARTMENT

UTILITIES STANDARDS HANDBOOK

LAST RATIFIED BY THE BOARD OF COUNTY COMMISSIONERS

DATE; JULY 27, 2010

DESOTO COUNTY
UTILITIES STANDARDS HANDBOOK

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SECTION 1

DESOTO COUNTY UTILITY

1.01 PURPOSE

DeSoto County's Utilities Standards Handbook was written to establish minimum technical specifications and standards for approval of water and wastewater facilities, transmission, collection, and distribution systems to be constructed within the Utility Service Area. It is also intended as a ready reference for Customers for standards and procedures to be used when working with the Utility.

1.02 DEFINITIONS

Except where specific definitions are used within a specific Section, the following terms, phrases, words, and their derivation shall have the meaning given herein when consistent with the context. Words used in the present tense include the future tense, words in the plural number include the singular number and words in the singular number include the plural number. The word "shall" is mandatory, and the word "may" is permissive.

A. AASHTO - means American Association of State Highway and Transportation Officials. Any reference to AASHTO standards shall be taken to mean the most recently published revision unless otherwise specified.

B. ADF - means average daily flow.

C. ANSI - means American National Standards Institute. Any reference to ANSI standards shall be taken to mean the most recently published revision unless otherwise specified.

D. APPLICANT - means the person, firm or corporation seeking service from the Utility and is engaged in developing or improving real estate for use or occupancy.

E. ASTM - means American Society for Testing Materials. Any reference to ASTM standards shall be taken to mean the most recently published revision unless otherwise specified.

F. AWWA - means American Water Works Association. Any reference to AWWA standards shall be taken to mean the most recently published revision unless otherwise specified.

G. APPLICANT'S ENGINEER - means an engineer or engineering firm registered with the State of Florida Department of Professional Regulation retained by the Applicant to provide professional engineering services for a project.

H. CONTRACTOR - means the person, firm, or corporation with whom the contract for Work has been made by the Owner, the Applicant, or the Utility.

I. COUNTY - means DeSoto County, Florida, a political subdivision of the State of Florida, the Board of County Commissioners, or the County Utilities Department, as the meaning indicates.

J. CUSTOMER – means the retail end-user of a utility service.

K. DIRECTOR - means the Director of the Utilities Department of the DeSoto County Utilities, acting directly or through an assistant or other representative authorized by the Director.

L. DR - means dimension ratio.

M. DRAWINGS - means engineering drawings and specifications prepared by an Engineer to show the proposed construction.

N. ENGINEER - means an engineer or engineering firm registered with the State of Florida Department of Professional Regulation.

O. ERU - means equivalent residential unit.

P. FDEP - means the Florida Department of Environmental Protection.

Q. FDOT - means the Florida Department of Transportation.

R. FOGs - means wastes that contain fats, oils or greases.

S. GEOTECHNICAL/SOILS ENGINEER - means a Registered Florida Engineer who provides services related to terrain evaluation and site selection, subsurface exploration and sampling, determination of soil and rock properties, foundation engineering, settlement and seepage analysis, design of earth and earth retaining structures, the design of subsurface drainage systems and the improvement of soil properties and foundation conditions, and testing and evaluation of construction materials.

T. GPD - means gallons per day.

U. GPM - means gallons per minute.

V. GREASE INTERCEPTOR - means a device constructed in accordance with Chapter 64E-6.013, Florida Administrative Code in order to separate, trap, or hold oil and grease substances from the wastewater discharged from a facility so as to prevent the oil and grease substance from entering the wastewater collection system. "Under the sink" grease "traps" shall not be construed as meeting the requirements of a Grease Interceptor for purposes of this Handbook.

W. HANDBOOK - means this DeSoto County Utilities Standards Handbook, as such may be amended from time to time.

X. MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES - means the United States Department of Transportation Manual on Traffic Control Devices, latest edition.

Y. MGD - means million gallons per day.

Z. NEMA - means National Electrical Manufacturers Association. Any reference to NEMA standards will be taken to mean the most recently published revision unless otherwise specified.

AA. NSF - means National Sanitation Foundation. Any reference to NSF standards shall be taken to mean the most recently published revision unless otherwise specified.

BB. OSHA - means the Federal Occupational Safety and Health Administration.

CC. OWNER - means the person, firm, corporation or governmental unit holding right of possession of the real estate upon which construction is to take place.

DD. SDR - means standard dimension ratio.

EE. SECTION - means a Section of this Handbook.

FF. STANDARD DRAWINGS - means the detailed drawings in this Handbook related to water, wastewater and reclaimed water pipeline and appurtenances materials and installation.

HH. TDH - means total dynamic head.

II. TRAFFIC CONTROL AND SAFE PRACTICES MANUAL - means the State of Florida Department of Transportation Manual on Traffic Control and Safe Practices for Street and Highway Construction, Maintenance and Utility Operation, latest edition.

JJ. UTILITY - means the DeSoto County Utilities Department and/or its designated representative(s).

KK. UTILITY SERVICE AREA - means the portion of DeSoto County (excluding the City of Arcadia and areas granted franchises within the County) for which the Utility provides water, wastewater or reclaimed water service.

LL. WATER MAINS - means water transmission mains, distribution mains, pipes, fittings, valves, hydrants, services, meters and miscellaneous related appurtenances.

MM. WASTEWATER MAINS - means wastewater gravity sewers, force mains, pump stations, fittings, valves, service laterals, and miscellaneous related appurtenances.

NN. WORK - means the labor, materials, equipment, supplies, services and other items necessary for the execution, completion and fulfillment of the contract.

1.03 CRITERIA OF REVIEW

No water, wastewater or reclaimed water treatment facility or associated transmission or distribution lines may be constructed in the Utility Service Area without obtaining prior approval by the Utility. The Utility evaluates applications for approval to construct facilities or associated lines based upon the following criteria:

A. Compliance to the procedures and technical specifications of the Utility as contained within utility ordinances of the County and this Handbook;

B. Compliance with DeSoto County zoning regulations;

C. Compliance with the DeSoto County Comprehensive Plan and Land Development Code, as amended; and

D. Observation and adherence to standard principles and practices of water and wastewater design and construction in the industry.

No application for approval shall be granted which fails to comply with the above criteria.

1.04 GENERAL INFORMATION

A. The information set forth in this document is intended to provide minimum standards for approving design and construction of water, wastewater and reclaimed water treatment, transmission, collection and distribution systems.

B. It shall be the responsibility of the Applicant to secure proper existing Utility information, and prepare Drawings (including plan and profile sheets) in accordance with these minimum standards. It remains the right of the Applicant to exceed these standards.

C. All Drawings submitted to the Utility shall be 24 inches x 36 inches.

D. Construction Drawings shall contain Utility approved plan and profile sheets showing all utilities and storm drains. No changes shall be made on approved Drawings without approval of the Utility and construction shall not begin prior to plan approval by the Utility.

E. Construction Drawings submitted to the Utility are to be the latest revision. Contractor must have a Utility approved set of Drawings on the project site. This set will be the only official reference set for construction.

F. Contractor shall use accurately marked piping and covers (manholes, valves, etc.) for any piping projects.

G. The Applicant shall furnish three (3) copies of shop Drawings plus any copies required by the Applicant to the Utility for approval prior to construction on all materials incorporated in a project.

1.05 DRAWINGS

A. All submitted Drawings shall be standard size sheet 24 inches by 36 inches with title block. Graphic scale(s) shall be provided on each sheet and all lettering shall be 1/8-inch or larger to permit photographic reproduction. Submittal of Drawings will only be required when special facilities outside the scope of this Handbook are proposed. All plan sheets and the title page of submitted Drawings must be signed, sealed and dated by the Applicant's Engineer.

B. Whenever possible, the entire water and wastewater systems shall be shown on a single master plan. The master plan shall indicate the general locations of all mains, manholes, valves, hydrants, services and service laterals with respect to the proposed development improvements and the existing water and wastewater systems. Main sizes shall be indicated on the master plan.

C. All gravity sewers, all wastewater force mains, and off-site Water Mains shall be drawn in plan and profile. On-site Water Mains may be shown in plan view only.

Whenever possible, on-site water and wastewater systems shall be shown on the same plan sheet. As a minimum, the plan and profile Drawings shall include the following information:

1. General information such as north arrow, names of designer and Engineer, revision block with dates, graphic scale(s) and sheet number;

2. Profile with elevations at 100-foot intervals, or more frequently if required by good design practice;

3. Development layout with horizontal and vertical controls;

4. All conflicts with other utility and drainage systems;

5. All manhole locations and rim elevations for manholes outside of paved areas;

6. Pipe data including size, lengths, material, and slopes;

7. Size, type, and locations of fittings, valves, hydrants, air release/vacuum relief, and other related appurtenances;

8. Limits of pipe deflection;

9. Limits of special exterior coatings;

10. Limits of special bedding requirements;

11. Pipe restraint requirements;

12. Details of connection to existing systems;

13. Location(s) and general layout of wastewater pumping stations; and

14. Construction notes regarding cover, horizontal and vertical control, special construction requirements, and references to standard and special details.

D. The Drawings shall include all applicable Standard Drawings as shown in this Handbook. Special details shall be prepared by the Applicant's Engineer for aerial and underwater crossings of rivers, streams, canals and ditches. Other special details shall be prepared by the Applicant's Engineer as required.

E. The master plan shall be prepared at a scale not to exceed 1 inch to 200 feet. Plan and profile sheets shall not exceed a scale of 1 inch to 50 feet. Special details shall be of sufficiently large scale to show pertinent construction information.

1.06 ADMINISTRATIVE PROCEDURES

A. The Applicant or his authorized representative shall initiate a pre-application conference by contacting the DeSoto County Utilities.

The meeting shall serve to set initial guidelines and communication channels between all interested parties.

B. It shall be the Applicant's responsibility to notify the Utility when ready for inspection, and his qualified representative shall be present at all scheduled tests and inspections. Prior to the "Final Inspection", all concerned parties shall inspect the project or facility to ensure quality workmanship and compliance with Utility standards. The Utility will notify the Applicant in writing as to any problem or outstanding items ("Punch List") required for final acceptance of the project. Upon completion of the "Punch List" Work, the Applicant shall notify the Utility and another inspection will be arranged. After all "Punch List" items are completed including any leaks and/or cracks verified by T.V. inspection, the Utility will conduct a "Final Inspection" of the completed Work. The inspection party shall include the Applicant, the Owner, the Engineer, and a representative from the Utility. Final acceptance shall not occur until all "Punch List" items are satisfactorily completed. The system shall remain isolated from the Utility system until final acceptance.

C. No flow shall be permitted until all required items for acceptance have been completed.

1.07 INSPECTION

A. A Utility Inspector will be assigned to all Utility projects.

B. The Utility Inspector shall inspect all construction and materials, and shall inspect preparation, fabrication or manufacture of components, and materials and supplies.

C. The Utility Inspector is not authorized to revoke, alter or waive any requirements of the specifications, but is authorized, and expected to call to the attention of Engineer and/or Contractor any failure of Work or materials to conform to the Drawings.

D. The Inspector shall have the authority to reject materials or suspend the Work until questions of issue can be resolved to the Utility's satisfaction.

E. The Inspector shall in no case act as a foreman, give advice nor perform other duties for the Applicant's Engineer and/or Contractor nor interfere with the management of the Work.

F. Inspectors will make routine passes to inspect such items as thrust blocks, materials on site, and clearances between conflicting lines. Scheduled inspections are also required for jacking and bore operations, setting of wet wells, lift station start-ups with manufacturer's representative present, and any time a connection is to be made to the Utility system.

1.08 PERSONS TO CONTACT

Key persons to contact concerning this Handbook are as follows:

DeSoto County Utilities
2170 NE Roan Street
Arcadia, Florida 34266

Any individuals at the above named facility would be more than happy to answer any questions or provide additional information on this Handbook.

1.09 PROCEDURE FOR OBTAINING CAPACITY

A. Applications for sewage or water capacity shall be submitted to DeSoto County Utilities. Applications shall consist of documentation as delineated in Section 2 and shall be available from the Utility. Applications will be given a preliminary screening when submitted and any incomplete or incorrect applications will be returned to the Applicant for necessary revisions. Accepted applications shall be entered on a categorical Pending Sewage or Water Capacity List. Applications will be classified by the following categories:

1. SUBDIVISION SINGLE FAMILY - Applicants desiring to build multiple single family residences,

2. LARGE MULTI-FAMILY - Applicants desiring to build multiple multi-family residential units,

3. COMMERCIAL/INDUSTRIAL/INSTITUTIONAL - Applicants desiring to build a commercial/industrial/institutional development.

4. AGRICULTURAL - Applicants requiring irrigation water for agricultural purposes.

B. Placement on a list will serve to confirm receipt of a valid application and insure an equitable "First Come - First Served" processing of applications. Applicants will be notified by certified mail that capacity is available for allocation for their specific project and advised as to any additional information or documentation required to facilitate review of their application.

C. Applicants will be required to provide such information or otherwise perfect a pending application within thirty (30) calendar days from notification by the Utility. Failure to provide requested information within this time will result in removal of the application from the appropriate Pending Sewage Capacity or Pending Water Capacity List.

D. Following review, processing, and approval of the application by the Utilities Department, the Sewer and/or Water Fees will be calculated for the project. Payment of the Fees, as prescribed in this policy, will be required before the application is finally certified by the Utility. Payment of the Sewer and/or Water Fees shall constitute a reservation of capacity and will remain as such, subject to complete compliance with other provisions of the policy.

E. To obtain sewage and/or water capacity allocations, the property for which capacity application is made must be appropriately zoned and platted to support the proposed development.

F. In cases of applications for capacity allocations for non-residential developments, the Applicant shall provide sufficient information to facilitate a reasonable estimate of capacity needs and determination of the Sewer and/or Water Fees. Capacity will be reserved based on this estimate and payment of the prescribed Fees; however, upon completion of final building plans, the plans shall be submitted for re-evaluation of capacity needs and re-computation of the Fees.

1.10 REGULATORY PERMITS

All permits required from any federal, state and local government entity having jurisdiction over the facilities proposed to be installed shall be obtained by the Applicant prior to submitting to the Utility an application for approval of the construction of water and wastewater utilities, transmission, collection, or distribution systems. Any application that fails to meet the requirements of all federal, state and local governing bodies will be deemed incomplete by the Utility.

1.11 ALLOCATION FACTORS AND LIMITATIONS

Evaluations of the DeSoto County Utility System have resulted in ERU flows of 255 GPD for water and 215 GPD for wastewater. In reserving and allocating capacity for applications submitted to the Utility the ERU factor method or one of the methods outlined in Section 3 shall be used. The method selected shall be approved by the Utility.

SECTION 2

CAPACITY DEMANDS AND APPLICATION PROCEDURES

2.01 GENERAL

Presented in this Section are design evaluations for the derivation of flow requirements and related capacity demand, application procedures. There are four major types of utility demands: raw and potable water, irrigation, fire flow and wastewater,

The demands outlined in this Section are necessary to operate and maintain the water and wastewater system and provide DeSoto County customers with a high quality, dependable utility service.

2.02 DEFINITIONS

Except where specific definitions are used within a specific Section, the following terms, phrases, words, and their derivation shall have the meaning given herein when consistent with the context. Words used in the present tense include the future tense, words in the plural number include the singular number and words in the singular number include the plural number. The word "shall" is mandatory, and the word "may" is permissive.

A. Single-family designation. A category of dwelling units including multiplex, modular and prefabricated, on individually-owned lots.

B. Multi-family designation. A category of grouped dwelling units generally master-metered, in which the Owner's or tenant's personal property use privilege is limited to interior areas only; and ownership, cost and use of common areas is shared with other Owners and/or tenants; and individual units have no exterior water usage.

C. Hotel/motel. Any building or groups of buildings containing sleeping room accommodations for guests, and providing the services generally provided by a hotel or motel and recognized as a hotel or motel in the community in which it is situated, or by the industry, and offering daily or weekly rates, with a bath or connecting bath for every rental unit, and occupied only by transient guests. Any such structure offering a combination of rooms for rent or lease for longer than a month at a time shall not be considered a hotel or motel.

D. Recreational vehicle park. A place set aside and offered by a person or public body, for either direct or indirect remuneration of the Owner, lessor, or operator of such place, for the parking and accommodation of recreational vehicles utilized for sleeping or eating; and the term also includes buildings and sites set aside for group camping and similar recreational facilities.

E. Duplex, Townhouse, villa, and other named dwellings with personal property use of exterior areas. A category of grouped dwelling units generally individually metered in which the Owner or tenant has personal property use of exterior areas

contiguous to dwelling interior areas; and ownership, cost and use of common areas is shared with other Owners and/or tenants; and each individual dwelling unit has the ability to have exterior water usage.

F. Mobile home, trailer. A structure which is transportable in one or more sections, which is built on a permanent chassis and which is designed to be used as a dwelling with or without a permanent foundation.

G. Manufactured Home Community. A community of dwellings subject to regulation by Chapter 723, Florida Statutes, as determined by the Department.

H. School. A private or public or not for profit institution conducting regular academic instruction at kindergarten, elementary or secondary levels or conducting training in business or at the vocational, collegiate, or postgraduate levels; or a day care facility providing services to preschool children (based upon capacity determined by the Department of Education or the school's vocational license).

I. Church. An institution that people regularly attend to participate in or hold religious services, meetings, and other activities. The term "church" shall not carry a secular connotation and shall include buildings in which the religious services of any denomination are held.

J. Club. Buildings or facilities owned or operated by a corporation, association, or persons for a social, educational or recreational purpose; but not primarily for profit or to render a service that is customarily carried on as a business.

K. Service station. Any premises where gasoline and other petroleum products are sold and/or light maintenance activities such as engine tuneups, lubrication, minor repairs, and carburetor cleaning may be conducted. Service stations shall not include premises where heavy automobile maintenance activities such as engine overhauls, automobile painting, and body fender work are conducted.

L. Restaurant. Any establishment (which is not a drive-in service establishment) where the principal business is the sale of food, desserts or beverages to the customer in a ready-to-consume state and where the design or principal method of operation includes one or more of the following.

M. Ice cream parlors and other small specialty restaurants having floor area exclusively within a shopping or office center and sharing common parking facilities with other businesses within the center and expressly prohibiting freestanding stores having characteristics of a drive-in restaurant.

N. Self-service restaurants, "fast food" restaurants where food is generally served in disposable containers and customers generally do the busing and clean-up for themselves or carry food out for consumption.

O. Tavern, bar cocktail lounge. An establishment serving alcoholic beverages in which the principal business is the sale of such beverages at retail for

consumption on the premises and where sandwiches and snacks are available for consumption on the premises.

P. Laundry or dry cleaners. A business that provides washing, drying, and/or ironing services or machines for hire to be used by customers on the premises.

Q. Commercial business. All nonresidential, noninstitutional and industrial establishments, but not limited to and without regard to whether they are profit or nonprofit organizations or retail and/or wholesale establishments; including stores, garages, cleaning establishments, for-hire services, and all other business required to obtain occupational licenses.

R. Office building. A building or portion of a building wherein services are performed involving predominately administrative, professional, or clerical operations.

S. Nursing/convalescent home. A home, institution, building or residence, public or private, whether operated for profit or not, presently licensed by the state, which provides maintenance, personal care or nursing for a period exceeding twenty-four (24) hours to three (3) or more ill, physically infirm, convalescing, or aged persons who are not related by blood or marriage to the operator. The definition of nursing or convalescent home does not include hospitals, clinics or similar institutions which are devoted primarily to the diagnosis and treatment of the sick or injured.

T. Hospital. An establishment that: (a) offers services more intensive than those required for room, board, personal services, and general nursing care, and offers facilities and beds for use beyond twenty-four (24) hours by individuals requiring diagnosis, treatment, or care for illness, injury, deformity, infirmity, abnormality, disease, or pregnancy, and (b) regularly makes available at least clinical laboratory services, diagnostic X-ray services, and treatment facilities for surgery or obstetrical care, or other definitive medical treatment of similar extent.

U. Warehouse. A building used exclusively for the storage of goods and materials, per ten thousand (10,000) square foot gross floor area or part thereof.

V. Industrial and manufacturing plant. A use engaged in the basic processing and manufacturing of materials or products predominately from extracted or raw materials, including citrus, or a use engaged in storage of, or manufacturing processes using flammable or explosive materials, or storage of manufacturing processes that potentially involve hazardous or commonly recognized offensive conditions or a use engaged in the manufacture, predominantly from previously prepared materials, of finished products or parts, including processing, fabrication, assembly, treatment, packaging, incidental storage, sales and distribution of such products. Industrial and manufacturing plant using water for processing and/or has discharge to wastewater system shall be determined on an individual basis using two hundred fifty five (255) gallons per day on a monthly basis for the calculation of units.

2.03 POTABLE WATER DEMAND

A. General:

All potable water connection fees will be determined by the calculated instantaneous water demand flow in GPM and required meter size. Derivation of the instantaneous potable water demand flow will be based on one or more of the derivation methods shown in Paragraphs 2.02 B, C, D and E below, as applicable to specific requirements and as required by the Utility. The Utility reserves the right to decide on the applicable method(s) to be used.

B. Equivalent Residential Unit (ERU) "Factor" Chart Method:

1. First the ERU factor will be determined from the ERU Determination Schedule shown in Table 2-1.

2. Second, the instantaneous water demand (in gallons per minute) will be determined from the Instantaneous Flow per ERU Schedule shown in Table 2-2.

TABLE 2-1

ERU DETERMINATION SCHEDULE

Establishment	Unit	ERU Factor
Residential		
Single Family Home	Per Unit	1.000
Duplex	Per Unit	1.000
Multi-Family	Per Unit	1.000
Mobile Home	Per Unit	1.000
Commercial (per 3000 sq. ft.)	Per Unit	1.000
Commercial (each additional 3000 sq. ft. or part thereof)	Per Unit	1.000
Barber/Beauty Shop (1 to 3 sinks)	Per Unit	1.000
Barber/Beauty Shop (each additional sink)	Per Sink	0.333
Bowling Alley	Per Lane	0.333

TABLE 2-1 (Continued)

ERU DETERMINATION SCHEDULE

Establishment	Unit	ERU Factor
Food Service		
Restaurant	Per Seat	0.100
Restaurant (24 hours)	Per Seat	0.167
Ice Cream Parlor or other small specialty restaurant	Per Seat	0.050
Restaurant ("Fast Food")	Per Seat	0.050
Tavern	Per Seat	0.067
Hotel, Motel	Per Room	1.000
Industrial Building		
Per 3,000 sq. ft. or 5 employees, whichever is greater	Per Unit	1.000
Laundry		
Self-Service	Per Machine	1.000
Office Building	Per 3,000 Sq. Ft.	1.000
Service Station		
Without repair or maintenance facilities	Per Unit	1.000
With repair or maintenance facilities	Per Unit	2.000
With car wash (per 255 GPD)	Per Unit	1.000
Recreational Vehicle Park	Per Space	0.670
Church	Per Seat	0.017
Hospital	Per Bed	1.000
Nursing Home	Per Bed	0.500
Nursing Home (additional 10 staff or segment thereof)	Per Unit	1.000
Schools	Per Student	0.067
Warehouse (per 10,000 sq. ft.)	Per Unit	1.000

TABLE 2-2

INSTANTANEOUS FLOW PER ERU SCHEDULE

No of ERU's	Instantaneous Flow (GPM)	No. of ERU's	Instantaneous Flow GPM	No. of ERU's	Instantaneous Flow GPM	No. of ERU's	Instantaneous Flow GPM
1	15	26	124	51	203	76	279
2	20	27	128	52	206	77	282
3	25	28	132	53	209	78	285
4	30	29	136	54	212	79	288
5	35	30	140	55	215	80	291
6	40	31	143	56	218	81	294
7	45	32	146	57	221	82	297
8	50	33	149	58	224	83	300
9	55	34	152	59	227	84	303
10	60	35	155	60	230	85	306
11	64	36	158	61	233	86	309
12	68	37	161	62	237	87	312
13	72	38	164	63	240	88	315
14	76	39	167	64	243	89	318
15	80	40	170	65	246	90	321
16	84	41	173	66	249	91	324
17	88	42	176	67	252	92	327
18	92	43	179	68	255	93	330
19	96	44	182	69	258	94	333
20	100	45	185	70	261	95	336
21	104	46	188	71	264	96	339
22	108	47	191	72	267	97	342
23	112	48	194	73	270	98	345
24	116	49	197	74	273	99	348
25	120	50	200	75	276	100	351

3. Example: A 250,000 square foot office building:

   a. Calculate ERUs from Table 3-1
   250,000 sq. ft. x 1.000 ERU/3000 sq. ft. = 84 ERUs

   b. Determine instantaneous potable water demand from Table 2-2
   84 ERUs = 303 Gallons Per Minute Instantaneous Demand

4. Last, using the number of ERUs the ADF in GPD for water capacity allocations is calculated by using the following formula:

   Number of ERUs x 255 GPD/ERU = ADF (GPD)

C. Fixture Unit Calculation Method:

1. First, the number of fixture units will be calculated using the information contained in Table 2-3.

2. Second, the total number of fixture units will be converted to equivalent residential units as follows:

   Total Number of Fixture Units x 25/255 = ERU Value

3. Third, the instantaneous potable water demand (in gallons per minute) will be determined from the Instantaneous Flow Per ERU Schedule shown in Table 2-2.

4. Example: A research laboratory with a total fixture unit number of 500:

   a. Convert Fixture Units to ERUs
   500 Fixture Units x 25/255 = 49 ERUs

   b. Determine instantaneous potable water demand from Table 2-2
   49 ERUs = 197 Gallons Per Minute Instantaneous Demand

5. Last, the ERU value will be converted to ADF in GPD for water capacity allocations by using the following formula:

   ERU Value x 255 GPD/ERU = ADF (GPD)

TABLE 2-3

FIXTURE UNIT CALCULATION TABLE

Instructions:

1. Indicate number of fixtures proposed, by type.
2. Multiply by Fixture Unit Values
3. Add values to obtain total number of fixture units.

	Fixture Type	Number Proposed	Fixture Unit Value (Each)			Fixture Units
1.	Bathroom Group (water closet, lavatory bathtub or shower stall)					
	Private Installation	_____	X	6	=	_____
	Public Installation	_____	X	8	=	_____
2.	Bathtub (with or without overhead shower)					
	1 1/2" minimum trap size	_____	X	2	=	_____
	2" minimum trap size	_____	X	3	=	_____
3.	Bidet	_____	X	3	=	_____
4.	Combination Sink and Tray	_____	X	3	=	_____
5.	Combination Sink and Tray with Food disposal unit	_____	X	4	=	_____
6.	Dental unit or cuspidor	_____	X	1	=	_____
7.	Dental lavatory	_____	X	1	=	_____
8.	Drinking Fountain	_____	X	0.5	=	_____
9.	Dishwashing machine domestic	_____	X	2	=	_____
10.	Floor Drainage (*See Note #1)	_____	X	*	=	_____
11.	Kitchen sink domestic	_____	X	2	=	_____
12.	Kitchen sink, with food waste grinder	_____	X	3	=	_____
13.	Lavatory (small P.O.) 1 1/4" Minimum Trap	_____	X	1	=	_____
14.	Lavatory (large P.O.) 1 1/2" Minimum Trap	_____	X	2	=	_____
15.	Lavatory, barber's, beauty parlor	_____	X	2	=	_____
16.	Lavatory, Surgeon's	_____	X	2	=	_____
17.	Laundry tray (1 or 2 compartments)	_____	X	2	=	_____
18.	Shower stall, domestic	_____	X	2	=	_____
19.	Showers, (group) per head	_____	X	3	=	_____
20.	Surgeon's Sinks	_____	X	3	=	_____
21.	Flushing rim sink (with valve)	_____	X	8	=	_____
22.	Service (trap standard) sink	_____	X	3	=	_____
23.	Service sink (P. Trap)	_____	X	2	=	_____
24.	Pot, Scullery, Mop, Sink etc.	_____	X	4	=	_____

TABLE 2-3 (Continued)

FIXTURE UNIT CALCULATION TABLE

	Fixture Type	Number Proposed	Fixture Unit Value (Each)			Fixture Units
25.	Urinal, pedestal, syphonjet, blowout	_____	X	8	=	_____
26.	Urinal, wall lip	_____	X	4	=	_____
27.	Urinal, stall, washout	_____	X	4	=	_____
28.	Urinal Trough (each 2 feet section)	_____	X	2	=	_____
29.	Washing Machine (residential)	_____	X	3	=	_____
30.	Washing Machine (commercial) *See Note #1	_____	X	*	=	_____
31.	Wash sink (circular or multiple) each set of faucets	_____	X	2	=	_____
32.	Water Closet, Private Installation	_____	X	4	=	_____
33.	Water Closet, Public Installation	_____	X	6	=	_____
		Total Number of Fixture Units				_____

*Notes:

#1

Fixture Drain or Trap Size	Fixture Unit Value
1 1/4"	1
1 1/2"	2
2"	3
2 1/2"	4
3"	5
4"	6

D. Special Considerations For Industrial Use:

Industrial use water shall be defined as water used for processing, manufacturing, cooling, make-up, cleaning and the like. The actual water demand for such use will be determined by the user and/or equipment manufacturer. The Applicant must submit sufficient information so as to clearly define requirements for review by the DeSoto Water Utility.

E. Existing Facility/Previous Records:

The Utility may consider the past records of an existing operational facility for determining proposed flow requirements for a new development, provided the Applicant submits sufficient information to allow the Utility to determine anticipated flow. This information shall include, but not be limited to twelve months previous water bills and a complete listing of the differences in the existing and proposed facility such as size, hours of operation, type of uses, number of employees, etc.

F. Meter Sizing:

Water meters will be sized by the instantaneous demand flow as calculated in Paragraphs 2.03 B, C, D and E above, according to the following schedule:

Instantaneous Demand	Meter Size
0-15 GPM	5/8 Inch
16-25 GPM	3/4 Inch
26-37 GPM	1 Inch
38-75 GPM	1 1/2 Inch
76-120 GPM	2 Inch
121-225 GPM	3 Inch
226-350 GPM	4 Inch
351-750 GPM	6 Inch
751-1200 GPM	8 Inch
1201-2000 GPM	10 Inch

2.04 IRRIGATION WATER DEMAND

A. General:

It is a policy of the DeSoto County to have separate potable water and irrigation water meters to provide for future wastewater reuse capabilities. In line with this policy, a separate irrigation water meter will be required. All irrigation water demands will be determined by required meter size based on the calculated water demand flow in GPM. Derivation of irrigation demand flow will be based on one of the methods outlined in Paragraphs 2.04 B or C below, as applicable and as required by the DeSoto County Utilities.

B. Actual Irrigation System Requirements:

If available, the Owner will submit to the Utility a complete plan of the proposed irrigation system with sufficient detail data so as to allow the Utility to calculate the required demand. Submittal data shall include, but not be limited to, main feed line size, sprinkler head flow requirements, number of heads per zone, number of zones, cycle times and total operation times for the system. Total system demand in gallons per minute will be computed using sound engineering practice and locally accepted methods.

C. Square Foot Application Method:

1. This method will be used if the requirements of paragraph B, above, cannot be met.

2. For the purpose of computations, an application rate of one and one-half (1½) inches of water per week per square foot will be used.

   Note: 1½ inches per week/square foot = 0.94 gallons per week/square foot

3. First, a determination of the total area to be irrigated must be determined by lot size less developed area.

4. Second, the total irrigated area must be converted to gallons per week by using the following formula:

   irrigation area (in sq.ft.) x 0.94 gallons per week/square foot = total gallons per week

5. Third, the total gallons per week must be converted to average GPM based on the proposed system use as follows:

   Gal./Week x 1 Week/__ Days Operated x 1 Day/__ Hours Operated x 1 Hour/60 Min. Average GPM

6. Example: 50,000 square feet irrigated 5 days per week for 6 hours per day.

   50,000 Sq.Ft. x 0.94 Gal. Per Week/Sq.Ft. x 1 Week/5 Days x 1 Day/ 6 Hours x 1 Hour/60 Minutes = 26 GPM

7. Last, the gallons per minute must be converted to ADF for water capacity allocations by using the following formula:

   Gallons Per Minute x 1440 Minutes/Day = ADF (GPD)

D. Meter Sizing:

Irrigation water meters will be sized by the total system demand flow as calculated in Paragraphs B and C above, according to the following schedule:

Flow Required	Meter Size
80-400	4 inch
180-900	6 inch
300-1500	8 inch
480-2400	10 inch
700-3500	12 inch

2.05 FIRE PROTECTION DEMAND

Specific fire protection requirements will be determined by and be in complete conformance with local and state fire protection regulations. Actual fire protection requirements will be based on information such as parcel size, building size and the type of establishment.

2.06 WASTEWATER DEMAND

A. General:

Wastewater Demand will be determined by the total ERU value calculated for each establishment. Derivation of the total ERU valve will be based on one or more of the derivation methods shown in Paragraphs 2.06 B, C, D and E below, as applicable to specific requirements and as required by the DeSoto County Utilities.

B. Equivalent Residential Unit "Factor" Chart Method:

1. ERU factor determined from the ERU Determination Schedule shown in Table 3-1.

2. Example: A 40,000 square foot office building.
40,000 Square Ft. x 1.000 ERU/3000 Square Ft. = 13 ERUs

3. The ERU value must also be converted to gallons per day (GPD) for wastewater capacity allocations by using the following formula:
ERU Factor x 215 GPD/ERU = ADF (GPD)

C. Fixture Unit Calculation Method:

1. First, the number of fixture units will be calculated using the information contained in Table 2-3.

2. Second, the total number of fixture units will be converted to equivalent residential units as follows:

Total Number of Fixture Units x 25/215 = ERU value

3. Example: A research laboratory with a total fixture unit number of 170.

170 Fixture Units x 25/215 = 20 ERUs

4. The ERU value must also be converted to GPD for wastewater capacity allocations by using the following formula:

ERU Value x 215 GPD/ERU = ADF (GPD)

D. Special Considerations For Industrial Use:

Industrial use shall be defined as wastewater resulting from processing, manufacturing, cooling, make-up, cleaning and the like. The actual wastewater

resulting from such use will be determined by the use and/or equipment manufacturer. The Applicant must submit information will be reviewed by the Utility to determine the actual ERUs produced using the relationship:

1 ERU = 215 GPD

All industrial flows must be pretreated to Utility acceptable levels by that industry on-site. All related costs for industrial pretreatment shall be borne by the industry and do not represent credits on any Utility fee.

E. Existing Facility/Previous Records:

The Utility may consider the past records of an existing operational facility for determining proposed flow requirements for a new development, provided the Applicant submits sufficient information to allow the Utility to determine anticipated flow. This information shall include, but not be limited to twelve months previous water bills and a complete listing of the differences in the existing and proposed facility such as but not limited to size, hours of operation, type of uses, number of employees, etc.

2.07 APPLICATION AND CONNECTION PROCEDURES

Stepwise Connection Procedure:

A. The Applicant shall purchase a copy of this Handbook for his/her use.

B. The Applicant shall completely review and become familiar with the information contained herein.

C. The Applicant shall submit capacity application forms with Drawings and all related submittal data. The Applicant pays a flat fee for all reviews.

D. The Utility will then review the application and capacity submittal.

E. The Utility will notify the Applicant concerning the applicable connection fees and capacity allocation requirements.

F. All required estimated connection fees and the administrative fee due to the Utility will be paid by the Applicant per the Utility ordinance schedule set by the Board.

G. The Applicant will then complete the final Drawings for improvements.

H. Once complete, the Applicant will submit the final Drawings to the Utility for review and approval.

I. The final Drawings will then be reviewed by the Utility and, if required, adjustments will be made to required connection fees and capacity allocation.

J. All required adjustments to connection fees due the Utility shall be paid prior to construction.

K. The Applicant will then provide the Utility with a construction schedule.

L. After notification from the Utility, the Contractor's construction forces may begin Work.

M. Utility user rates enter into effect at the time of notification to the Applicant that construction may begin.

N. Unless otherwise mutually agreed between the Utility and the Applicant, the Utility's construction forces will make required connections, tie-ins, set required meters and notify the Applicant immediately upon completion of these tasks.

SECTION 3

GENERAL CONSTRUCTION REQUIREMENTS

3.01 GENERAL

This Section sets forth the general requirements for construction and installation of water and wastewater utility facilities.

3.02 GRADES, SURVEY LINES, AND PROTECTION OF MONUMENTS

A. Grades: All Work shall be constructed in accordance with the lines and grades shown on the Drawings. The full responsibility for keeping alignment and grade shall rest upon the Applicant.

Bench marks and base line controlling points shall be established prior to beginning Work. Reference marks for lines and grades as the Work progresses will be located to cause as little inconvenience to the prosecution of the Work as possible. The Applicant shall so place excavation and other materials as to cause no inconvenience in the use of the reference marks provided. The Applicant shall remove any obstructions placed contrary to this provision.

B. Surveys: The Applicant shall furnish and maintain, at his own expense, stakes and other such materials, and give such assistance, including qualified helpers, for setting reference marks to the satisfaction of the Utility and the Engineer. The Applicant shall check such reference marks by such means as he may deem necessary and, before using this, shall call the Utility's attention to any inaccuracies. The Applicant shall, at his own expense, establish all working or construction lines and grades as required from the reference marks, and shall be solely responsible for the accuracy thereof. The Applicant shall, however, be subject to the check and review of the Utility.

C. Monument Preservation: Property corners and survey monuments shall be preserved using care not to disturb or destroy them. If a property corner or survey monument is disturbed or destroyed during construction, whether by accident, careless work, or required to be disturbed or destroyed by the construction Work, said property corner or survey monument shall be restored by a land surveyor registered in the State of Florida. All costs for this Work shall be paid for by the Applicant.

3.03 UTILITY COORDINATION

A. Location of Utilities: Prior to proceeding with trench excavation, the Applicant shall contact all utility companies that serve the area for aid in locating their underground services. It shall be the Applicant's responsibility to contact utility companies at least three (3) normal working days before starting construction. The Applicant shall proceed with caution in the excavation and preparation of the trench so that the exact location of underground utilities may be determined.

The Applicant shall take all reasonable precautions against damage to existing utilities. However, in the event of a break in an existing water main, gas main, sewer or underground cable, the Applicant shall immediately notify the responsible official of the organization operating the interrupted utility. The Applicant shall restore services and assume all cost, charges, or claims connected with the interruption and repair of such services.

B. Deviations Occasioned by Structures or Utilities: Wherever obstructions are encountered during the progress of the Work and interfere to such an extent that an alteration in the Drawings is required, the Utility shall have the authority to order a deviation from the line and grade or arrange with the Owners of the structures for the removal, relocation or reconstruction of the obstructions. Where gas, water, telephone, electrical, hot water, steam or other existing utilities are an impediment to the vertical or horizontal alignment of the proposed pipe line, the Utility shall approve a change in grade or alignment or shall direct the Applicant to arrange with the Owners of the utilities for their removal. If a change in line or grade of a gravity sewer is necessary, the Utility will require the addition of any manholes needed to maintain the integrity of the sewer system.

C. Test Pits: Test pits for the purpose of locating underground pipeline, utilities, or structures in advance of the construction shall be excavated and backfilled by the Applicant. The appropriate utility company shall be notified 48 hours in advance of any test pit investigation. Test pits shall be backfilled immediately after their purpose has been fulfilled and maintained in a manner satisfactory to the Utility. The costs for such test pits shall be borne by the Applicant.

3.04 MAINTENANCE OF TRAFFIC AND CLOSING OF STREETS

A. The Applicant shall carry on the Work in a manner that will cause a minimum of interruption to traffic. Where traffic must cross open trenches, the Applicant shall provide suitable bridges at street intersections and driveways. The Applicant shall post suitable signs indicating that a street is closed and necessary detour signs for the proper maintenance of traffic. Prior to closing of any streets the Applicant shall notify and obtain the approval of responsible authorities and the Utility.

B. Unless permission to close a street is received in writing from the proper authority (County, FDOT, etc.), all excavated material shall be placed so that vehicular and pedestrian traffic may be maintained at all times. If the Applicant's operations cause traffic hazards, the Applicant shall repair the road surface, provide temporary ways, erect wheel guards or fences, or take other measures for safety satisfactory to the Utility.

C. Detours around construction will be subject to the approval of the authority having jurisdiction and the Utility. Where detours are permitted, the Applicant shall provide all necessary barricades and signs as required to divert the flow of traffic. While traffic is detoured the Applicant shall expedite construction operations. Periods when traffic is being detoured will be strictly controlled by the Utility.

D. It shall be the sole responsibility of the Applicant to take precautions to prevent injury to the public due to open trenches. Night watchmen may be required where special hazards exist, or police protection may be provided for traffic while Work is in progress. The Applicant shall be fully responsible for damage or injuries whether or not police protection has been provided.

E. A Maintenance of Traffic Plan is to be prepared in accordance with Manual of Uniform Traffic Control Devices (MUTCD), the latest edition of FDOT Design Standards and County Land Development Regulations (LDR). This plan is to be submitted and approved by the Utility prior to the commencement of construction.

3.05 PROTECTION OF PUBLIC AND PROPERTY

A. Barricades, Guards and Safety Provisions: The Applicant shall be solely responsible for adhering to the rules and regulations of OSHA and appropriate authorities regarding safety provisions. To protect persons from injury and to avoid property damage, adequate barricades, construction signs, lights and guards as required shall be placed and maintained by the Applicant at his expense during the progress of the Work and until it is safe for traffic to use the roads and streets. All material piles, equipment and pipe which may serve as obstructions to traffic shall be enclosed by fences or barricades and shall be protected by proper lights when visibility is poor. All signs and barricades shall be in accordance with the Manual on Uniform Traffic Control Devices and the Traffic Control and Safe Practices Manual.

B. Protection of Utility Structures: Temporary support, adequate protection and maintenance of all underground and surface utility structures including drains, sewers, manholes, hydrants, valves, valve covers, power poles and other miscellaneous utility structures encountered in the progress of the Work shall be furnished by the Applicant at his expense. Any such structures that may have been disturbed shall be restored upon completion of the Work.

C. Open Excavation: All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons and damage to property. The Applicant shall, at his own expense, provide suitable and safe bridges with hand railings and other crossings for accommodating travel by pedestrians and workmen. Bridges provided for access to private property during construction shall be removed when no longer required. The length of an open trench will be controlled by the particular surrounding conditions, but shall be limited to 300 feet unless otherwise approved by the Utility. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the Utility may require special construction procedures such as limiting the length of open trench, fencing, prohibiting excavated material in the street and requiring that the trench shall not remain open overnight. The Applicant shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment or other obstacles, which could be dangerous to the public, shall be well lighted at night.

D. Protection of Trees and Shrubs: All trees and shrubs not shown to be removed on the Drawings shall be protected by the Applicant at the Applicant's expense. No excavated materials shall be placed so as to injure such trees or shrubs. Trees or shrubs destroyed by negligence of the Applicant or his employees shall be replaced by the Applicant with new stock of similar size and age at the sole expense of the Applicant.

E. Protection of Lawn Areas: Lawn areas shall be left in as good or better condition as before starting of the Work. Where sod is to be removed it shall be carefully restored with new sod of the same type.

F. Restoration of Fences: Any fence, or part thereof, that is damaged or removed during the course of the Work shall be replaced or repaired by the Applicant and shall be left in as good a condition as before the starting of the Work. The manner in which the fence is repaired or replaced and the materials used shall be subject to the approval of the Utility.

G. Protection Against Siltation and Bank Erosion: The Applicant shall arrange his operations to minimize siltation and bank erosion on construction sites and on existing or proposed water courses and drainage ditches. The Applicant shall provide for the interception and retention of small amounts of sediment (silt) from construction sites in order to prevent silt from leaving the construction. Filter barriers or silt fences shall be employed in this regard. Filter barriers composed of burlap or standard weight synthetic fabric stapled to wooden stakes shall be used in ditch lines, around drop inlets, and at temporary sites where construction changes the earth contour and water run-off. Filter barriers shall be used where flows not exceeding one (1) cubic foot per second are expected. Silt fences shall be employed where sheet or overland flows are expected. Filter barriers and silt fences shall be constructed according to the guidelines set forth in the FDEP guide to a Sound Land and Water Management, Stormwater Management Practices, Chapter 6. The Applicant, at his own expense, shall remove any siltation deposits and restore the site to the original grade.

3.06 ACCESS TO PUBLIC SERVICES

Neither the materials excavated nor the materials or equipment used in the construction of the Work shall be so placed as to prevent free access to public services. All excavated material shall be piled in a manner that will not endanger the Work and that will avoid obstructing streets, sidewalks and driveways. Excavated material suitable for backfilling shall be stockpiled separately on the site. No material shall be placed closer than two (2) feet from the edge of an excavation. Fire hydrants under pressure, valve pit covers, valve boxes, curb stop boxes, or other utility controls shall be left unobstructed and accessible until the Work is completed. Gutters shall be kept clear or other satisfactory provisions made for street drainage. Natural water courses shall not be obstructed or polluted. Surplus material and excavated material unsuitable for backfilling shall be transported and disposed of off the site in disposal areas obtained by the Applicant.

3.07 PUBLIC NUISANCE

The Applicant shall not create a public nuisance including but not limited to encroachment on adjacent lands, flooding of adjacent lands, or excessive noise or dust. The Applicant shall eliminate noise to as great an extent as practicable at all times.

3.08 CONSTRUCTION HOURS

A. No Work shall be done between the hours of 6:00 p.m. and 7:00 a.m., or on Saturdays and Sundays unless the proper and efficient prosecution of the Work requires operations during the night or weekend. Written notification for doing the Work shall be provided to the Utility a minimum 24 hours before starting such items of the Work.

B. If Utility inspectors are required after working hours or on holidays, the Applicant is to reimburse the Utility for any pay due to said inspector.

3.09 CONSTRUCTION IN EASEMENTS AND RIGHTS-OF-WAY

A. Construction Easements: In easements across private property, the Applicant shall confine all operations within the easement area and shall be responsible and liable for all damage outside of the easement area. Trees, fences, shrubbery or other type of surface improvements located in easements will require protection during construction. Precautions shall be taken by adequate sheeting or other approved method to prevent any cave-in or subsidence beyond the easement limits or damage to improvements within the easement. In general, the easement area is intended to provide reasonable access and working area for efficient operation by the Applicant. Where easement space for efficient operation is not provided, the Applicant shall be responsible for organizing operations to perform within the restrictions shown on the Drawings.

B. Construction in FDOT Rights-of-Way: The County shall not allow construction in FDOT rights-of-way except by special agreement with the Utility. Such special agreement will require deposit of funds deemed sufficient to relocate the utilities being installed should the FDOT require such relocation in the future. In the event the Utility and the Applicant enter into such agreement, the Applicant shall strictly adhere to the requirements of the FDOT where construction Work is in a right-of-way under the jurisdiction of the State of Florida, and shall take care to avoid any unreasonable traffic conflicts due to the Work in road rights-of-way.

C. Construction within County rights-of-way shall be allowed so long as such construction does not interfere with previously existing utilities or previously planned utilities of the Utility. In the event that such conflicts arise, the Applicant shall construct the utilities in easements on private property or pay for utility relocation if deemed feasible by the Director.

3.10 SUSPENSION OF WORK DUE TO WEATHER

During inclement weather, all Work that might be damaged or rendered inferior by such weather conditions shall be suspended. During suspension of the Work from any cause, the Work shall be suitably covered and protected so as to preserve it from injury by the weather or otherwise.

3.11 USE OF CHEMICALS

All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant, or other classification, must show approval of either United States Environmental Protection Agency (USEPA) or United States Department of Agriculture (USDA). Use of all such chemicals and disposal of residues shall be in strict conformance with label instructions.

3.12 COOPERATION WITH OTHER APPLICANTS AND FORCES

During construction progress, it may be necessary for other Contractors and persons employed by the Utility to work in or about the site. The Utility reserves the right to put such other Contractors to work and to afford such access to the construction site and at such times as the Utility deems proper. The Applicant shall not impede or interfere with the Work of such other Contractors and shall cooperate with the other Contractor(s) for proper prosecution of the Work.

3.13 SUBSURFACE EXPLORATION

The Applicant shall make such subsurface explorations as the Applicant and the Utility believes necessary to perform the Work.

3.14 CLEANING

A. During Construction: During construction the Applicant shall, at all times, keep the construction site and adjacent premises as free from material, debris and rubbish as is practicable and shall remove the same from any portion of the site if, in the opinion of the Utility, such material, debris, or rubbish constitutes a nuisance or is objectionable.

B. Final Cleaning: At the conclusion of the Work, all tools, temporary structures and materials belonging to the Applicant shall be promptly removed. The Applicant shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances.

3.15 SALVAGE

Any existing Utility owned equipment or material including but not limited to valves, pipes, fittings, couplings, etc., which is removed or replaced as a result of construction may be designated as salvage by the Utility, and if so, shall be carefully removed from the site and delivered to the Utility at a location within the County.

3.16 SHOP DRAWINGS AND SAMPLES

If requested by the Utility, prior to construction, the Applicant shall submit three (3) copies of the shop Drawings, signed by the Applicant's Engineer, to the Utility. The data shown on the shop Drawings shall be complete with respect to dimensions, design criteria, materials of construction and the like to enable review of the information as required. The Applicant shall, if

requested by the Utility, furnish certificates, affidavits of compliance, test reports, or samples for check analysis for any of the materials specified in this Handbook.

3.17 CLEARING AND GRUBBING

A. The Applicant shall clear and grub all of the areas within the limits of construction as shown on the Drawings and approved by the Utility prior to the beginning of any Work. All site Work shall conform to the applicable site clearing ordinance, landscaping, and tree ordinances of the County.

B. Clearing: The surface of the ground for the area to be cleared and grubbed shall be completely cleared of all timber, brush, stumps, roots, grass, weeds, rubbish and all other objectionable obstructions resting on or protruding through the surface of the ground. However, trees and shrubs shall be preserved as specified in Section 3.05D. Clearing operations shall be conducted so as to prevent, damage to existing structures and installations and to those under construction, and so as to provide for the safety of employees and others.

C. Grubbing: Grubbing shall consist of the complete removal of all stumps, roots larger than 1-1/2 inches in diameter, matted roots, brush, timber, logs and any other organic or metallic debris not suitable for foundation purposes, resting on, under or protruding through the surface of the ground to a depth of 18 inches below the sub-grade. All depressions excavated below the original ground surface for or by the removal of such objects shall be refilled with suitable materials and compacted to a density conforming to the surrounding ground surface.

D. Stripping: In areas so designated, top soil shall be stripped and stockpiled. Topsoil so stockpiled shall be protected until it is placed as specified. Any topsoil remaining after all Work is in place shall be disposed of by the Applicant.

3.18 EXCAVATION, BACKFILL, COMPACTION AND GRADING

A. All such Work shall be performed by the Applicant concurrently with the Work specified in the Drawings. The Applicant shall furnish all labor, materials, equipment and incidentals necessary to perform all excavation, backfill, fill, compaction, grading and slope protection required to complete the Work shown on the Drawings and specified herein. The Work shall include, but not necessarily be limited to pump stations, manholes, vaults, conduit, pipe, roadways and paving; all backfilling, fill and required borrow; grading; disposal of surplus and unsuitable materials; and all related Work such as sheeting, bracing and water handling.

B. The Applicant shall examine the site and undertake subsurface investigations including soil borings before commencing the Work. The Utility will not be responsible for presumed or existing soil conditions in the Work area.

C. The Applicant shall locate existing utilities in the areas of the Work. If utilities are to remain in place, the Applicant shall provide adequate means of protection

during earthwork operations. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, the Applicant shall consult the Owner of such piping or utility immediately for directions. Payment for damage and repair to such piping or utilities is the Applicant's responsibility. Refer to Section 3.03 for utility coordination requirements. The Utility shall not be responsible for uncharted or incorrectly charted Water Mains and Wastewater Mains or other utilities. It is the Applicant's responsibility to ensure that such facilities exist at the presumed point prior to commencing construction.

D. Materials for use as bedding and backfill, whether in situ or borrow, shall be as described under this Section. The Applicant shall, upon request by the Utility, make an appropriate sample of this material available for testing by the Utility or its designated representative.

1. Materials for structural fill shall be bedding rock or select common fill as specified herein or other suitable material as approved by the Utility.

2. Common fill shall consist of mineral soil and substantially free of clay, organic material, loam, wood, trash and other objectionable material which may be compressible or which cannot be compacted properly. Common fill shall not contain stones larger than six (6) inches in any dimension, or asphalt, broken concrete, masonry, rubble, or other similar materials. It shall have physical properties such that it can be readily spread and compacted during filling. Additionally, common fill shall be no more than 12 percent by weight finer than the No. 200 mesh sieve unless finer material is approved for use in a specific location by the Utility.

3. Material falling within the above specifications encountered during the excavation may be stored in segregated stockpiles for reuse. All material which, in the opinion of the Utility, is not suitable for reuse shall be spoiled as specified herein for disposal of unsuitable materials.

4. Select common fill shall be as specified above for common fill except that the material shall contain no stones larger then 1-1/2 inches in largest dimension, and shall be no more than five (5) percent by weight finer than the No. 200 mesh sieve.

5. Bedding rock shall be 3/16-inch to 3/4-inch washed and graded stone (FDOT #57). This stone shall be graded so that 90- to 100-percent will pass a 3/4-inch screen and 95- to 100-percent will be retained on a No. 8 screen. No stones larger than one (1)-inch in any dimension shall be acceptable. This bedding is required if the trench is wet.

E. Sheeting and Bracing in Excavations: All sheeting and shoring of excavations will be in accordance with the Florida Trench Safety Act. If required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction, and to protect adjacent structures, existing piping and/or foundation material from

disturbance, undermining or other damage, the Applicant shall construct, brace and maintain cofferdams consisting of sheeting and bracing. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed.

F. For trench sheeting for pipes, no sheeting is to be withdrawn if driven below mid-diameter of any pipe and no wood sheeting shall be cut off at a level lower than one foot above the top of any pipe unless otherwise directed by the Utility. If during the progress of the Work, the Utility decides that additional wood sheeting should be left in place, it may direct the Applicant to do so. If steel sheeting is used for trench sheeting, removal shall be as specified above, unless written approval is given by the Utility for an alternate method of removal. All sheeting and bracing not left in place shall be carefully removed in such a manner so as not to endanger the integrity of other structures, utilities, existing piping or property. Unless otherwise approved or indicated on the Drawings, all sheeting and bracing shall be removed after completion of the substructure. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by ramming with tools specially adapted to that purpose, by watering or otherwise as may be directed.

G. The right of the Utility to order sheeting and bracing left in place shall not be construed as creating any obligation on its part to issue such orders and its failure to exercise its right to do so shall not relieve the Applicant from liability for damages to persons or property occurring from or upon the Work occasioned by negligence or otherwise, growing out of a failure on the part of the Applicant to leave in place sufficient sheeting and bracing to prevent any caving in or moving of the ground.

H. The Applicant shall construct the cofferdams and sheeting outside the neat lines of the foundation unless indicated otherwise to the extent he deems it desirable for his method of operation. Sheeting shall be plumb and securely braced and tied in position. Sheeting, bracing and cofferdams shall be adequate to withstand all pressures to which the structure will be subjected. Pumping, bracing and other Work within the cofferdam shall be done in a manner to avoid disturbing any construction already performed. Any movement or bulging, which may occur, shall be corrected by the Applicant at his own expense so as to provide the necessary clearances and dimensions.

I. Dewatering, Drainage and Flotation: The Applicant shall excavate, construct and place all pipelines, concrete work, fill, and bedding rock, in-the-dry. In addition, the Applicant shall not make the final 24 inches of excavation until the water level is a minimum of one (1)-foot below proposed bottom of excavation. For the purpose of these specifications, "in-the-dry" is defined to be within two (2) percent of the optimum moisture content of the soil. The Utility reserves the right to ask the Applicant to demonstrate that the water level is a minimum of one (1)-foot below the proposed bottom of excavation before allowing the construction to proceed.

J. Discharge water shall be clear with no visible soil particles. Discharge from dewatering shall be disposed of in such a manner that it will not interfere with the normal drainage of the area in which the Work is being performed, create a public nuisance, or cause ponding. The operations shall not cause injury to any portion of the Work completed or in progress, or to the surface of streets, or to private property. The dewatering operation shall comply with the requirements of appropriate regulatory agencies. Additionally, where private property will be involved, advance permission shall be obtained by the Applicant.

K. The Applicant shall, at all times during construction, provide and maintain proper equipment and facilities to remove promptly and dispose of properly all water entering excavation. The Applicant shall keep such excavations dry so as to obtain a satisfactory undisturbed sub-grade foundation condition until the fill, structure, or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural elevations.

L. Dewatering shall at all times be conducted in such a manner so as to preserve the natural undisturbed bearing capacity of the sub-grade soils at the proposed bottom of the excavation.

M. It is expected that wellpoints will be required for pre-drainage of the soils prior to final excavation for some of the deeper in-ground structures or piping and for maintaining the lowered groundwater level until construction has been completed to such an extent that the structure, pipeline or fill will not be floated or otherwise damaged. Wellpoints shall be surrounded by suitable filter sand and negligible fines shall be removed by pumping.

N. The Applicant shall furnish all materials and equipment and perform all Work required to install and maintain the drainage systems for handling groundwater and surface water encountered during construction of structures, pipelines and compacted fills.

O. During backfilling and construction, water levels shall be measured in observation wells located as directed by the Utility. Continuous pumping will be required as long as water levels are required to be below natural levels.

P. Excavations, General:

1. Excavation consists of removal, storage and disposal of material encountered when establishing required grade elevations and in accordance with the notes shown in the Drawings. Authorized earth excavation includes removal and disposal of pavements and other obstructions visible on ground surface, underground structures and utilities indicated to be demolished and removed, and other materials encountered that are not classified as rock excavation or unauthorized excavation. Unauthorized excavation consists of removal of material beyond the limits needed to establish required grade and sub-grade elevations without specific direction of the Utility. Unauthorized excavation, as well as

remedial Work directed by the Utility shall be at the Applicant's expense. Such remedial Work shall be performed as directed by the Utility.

2. If requested by the Utility, when excavation has reached required sub-grade elevations, a Geotechnical/Soils Engineer shall make an inspection of conditions. If the sub-grade is unsuitable, the Applicant shall carry the excavation deeper and replace excavated material with select common fill or bedding rock, as directed by the Utility.

3. If the Applicant excavates below grade, through error or for his own convenience or through failure to properly dewater the excavation or disturbs the sub-grade before dewatering is sufficiently complete, he may be directed by the Utility to excavate below grade and refill the excavation using select common fill or bedding rock.

4. Slope sides of excavations shall comply with local codes and ordinances, and with OSHA requirements. The Applicant shall shore and brace where sloping is not possible due to space restrictions or the stability of the material excavated. Sides and slopes shall be maintained in a safe condition until completion of backfilling.

Q. The Applicant shall stockpile satisfactory excavated materials at a location approved by the Utility until required for backfill or fill. When needed in the Work, material shall be located and graded at the direction of a Geotechnical/Soils Engineer.

R. Stockpiles shall be placed and graded for proper drainage. All soil materials shall be located away from the edge of excavations. All surplus and/or unsuitable excavated material shall be legally disposed of by the Applicant. Any permits required for the hauling and disposing of this material shall be obtained by the Applicant prior to commencing hauling operations.

S. Excavations, Specific:

1. Excavation for Structures: All such excavations shall conform to the elevations and dimensions shown on the drawing within a tolerance of plus or minus 0.10 feet and extending a sufficient distance from the footings and foundations to permit placing and removing formwork, installation of services and other construction, inspection or as shown on the Drawings. In excavating for footings and foundations, care shall be exercised not to disturb the bottom of the excavation. Bottoms shall be trimmed to required lines and grades to leave a solid base to receive concrete.

2. Trench Excavation: Excavation for all trenches required for the installation of utility pipes shall be made in accordance with the Drawings and to the depths indicated on the Drawings, and in such a manner and to such widths as will give suitable room for laying the pipe within the

trenches, for bracing and supporting, and for pumping and drainage facilities.

3. The bottom of the excavations shall be firm and dry and in all respects acceptable to the Utility. Excavation shall not exceed normal trench width as specified in the Standard Drawings. Any excavation that exceeds the normal trench width shall require special backfill requirements as determined by the Utility.

4. Where pipes are to be laid in bedding rock, select common fill, or encased in concrete, the trench may be excavated by machinery to or just below the designated sub-grade provided that the material remaining in the bottom of the trench is no more than slightly disturbed.

5. Where the pipes are to be laid directly on the trench bottom, the lower part of the trenches shall not be excavated to grade by machinery. The last of the material being excavated shall be done manually in such a manner that will give a shaped bottom, true to grade, so that the pipes can be evenly supported on undisturbed material, as specified in the Standard Drawings. Bell holes shall be made as required.

T. Bedding and Backfill:

1. Material placed in fill areas under and around structures and pipelines shall be deposited within the lines and to the grades shown on the Drawings or as directed by the Utility, making due allowance for settlement of the material. Fill shall be placed only on properly prepared surfaces that have been inspected and approved by the Utility. If sufficient select common or common fill material is not available from excavation on site, the Applicant shall provide fill as may be required.

2. Fill shall be brought up in substantially level lifts starting in the deepest portion of the fill. The entire surface of the Work shall be maintained free from ruts and in such condition that construction equipment can readily travel over any section.

3. Fill shall be placed and spread in layers by a backhoe or other approved method, unless otherwise specified. Prior to the process of placing and spreading, all materials not meeting those specified under Section 3.18(D) shall be removed from the fill areas. The Applicant shall assign a sufficient number of men to this Work to insure satisfactory compliance with these requirements.

4. If the compacted surface of any layer of material is determined to be too smooth to bond properly with the succeeding layer, it shall be loosened by harrowing or by another approved method before the succeeding layer is placed.

5. All fill materials shall be placed and compacted "in-the-dry". The Applicant shall dewater excavated areas as required to perform the Work and in such manner as to preserve the undisturbed state of the natural inorganic soils.

6. Prior to filling, the ground surface shall be prepared by removing vegetation, debris, unsatisfactory soil materials, obstructions and deleterious materials. The Applicant shall plow strip or break up sloped surfaces steeper than one (1) vertical to four (4) horizontal so that fill material will bond with the existing surface. When the existing ground surface has a density less than specified under Section 3.18(D) for the particular area classification, the Applicant shall break up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to the required depth and percentage of maximum density.

7. Before compaction, material shall be moistened or aerated as necessary to provide the optimum moisture content. Material that is too wet shall be spread on the fill area and permitted to dry, assisted by harrowing if necessary, until the moisture content is reduced to allowable limits. If added moisture is required, water shall be applied by sprinkler tanks or other sprinkler systems which will insure uniform distribution of the water over the area to be treated, and give complete and accurate control of the amount of water to be used. If too much water is added, the area shall be permitted to dry before compaction is continued. The Applicant shall supply all hose, piping, valves, sprinklers, pumps, sprinkler tanks, hauling equipment, and all other materials and equipment necessary to place water in the fill in the manner specified. The Applicant shall compact each layer to the required percentage of maximum dry density or relative dry density in accordance with Section 3.18(U). Backfill or fill material shall not be placed on surfaces that are muddy, frozen or contain frost or ice.

8. Bedding and Backfill for Structures: Bedding rock shall be used for bedding under all structures as indicated on the Standard Drawings. The Applicant shall take all precautions necessary to maintain the bedding in a compacted state and to prevent washing, erosion or loosening of this bed. Structural fill shall be used as backfill against the exterior walls of the structures. Fill shall be compacted sufficiently in accordance with Section 3.18(U) of these specifications. If compaction is by rolling or ramming, material shall be wetted down as required.

9. Backfilling shall be carried up evenly on all walls of an individual structure. No backfill shall be allowed against walls until the walls and their supporting slabs, if applicable, have attained sufficient strength.

10. In locations where pipes pass through building walls, the Applicant shall take precautions to consolidate the fill up to an elevation of at least one (1) foot above the bottom of the pipes. Structural fill in such areas shall be placed for a distance of not less than three (3) feet on either side of the

center line of the pipe in level layers not exceeding eight (8) inches in depth.

11. The surface of filled areas shall be graded to smooth true lines, strictly conforming to grades indicated on the Drawings. No soft spots or un-compacted areas will be allowed in the Work.

12. Temporary bracing shall be provided as required during construction of all structures to protect partially completed structures against all construction loads, hydraulic pressure and earth pressure. The bracing shall be capable of resisting all loads applied to the walls as a result of backfilling.

13. Bedding and Backfill for Pipes: Bedding for pipes shall be as shown on the Drawings and detailed on the Standard Drawings. The Applicant shall take all precautions necessary to maintain the bedding in a compacted state and to prevent washing, erosion or loosening of this bed.

14. Backfilling over and around pipes shall begin as soon as practicable after the pipes have been laid, jointed and inspected. All backfilling shall be prosecuted expeditiously and as detailed on the Standard Drawings.

15. Any space remaining between the pipes and sides of the trench shall be carefully backfilled and spread by hand or an approved mechanical device and thoroughly compacted with a tamper as fast as placed, up to a level of one (1) foot above the top of the pipes. The filling shall be carried up evenly on both sides. Compaction shall be in accordance with the Standard Drawings and Section 3.18(U).

16. The remainder of the trench above the compacted backfill, as described above, shall be filled and thoroughly compacted in uniform layers. Compaction shall be in accordance with the Standard Drawings and Section 3.18(U).

U. Compaction: The Applicant shall control soil compaction during construction to provide the percentage of maximum density specified. The Applicant shall provide the Utility with copies of all soils testing reports, prepared by a Geotechnical/Soils Engineer, demonstrating compliance with these specifications.

1. When the existing trench bottom has a density less than that specified under Section 3.18(D), the Applicant shall break up the trench bottom surface, pulverize, moisture-condition to the optimum moisture content, and compact to required depth and percentage of maximum density.

2. Percentage of Maximum Density Requirements:

   a. Fill or undisturbed soil from the bottom of the pipe trench to one (1) foot above the pipe shall be compacted to a minimum density of 95 percent of the maximum dry density as determined by AASHTO T-180.

b. Backfill from one and one half (1.5) feet above utility pipes to grade shall be compacted to a minimum density of 95 percent of the maximum dry density as determined by AASHTO T-180.

c. Fill under and around structures, and to the extent of the excavation shall be compacted to a minimum density of 95 percent of the maximum dry density as determined by AASHTO T-180.

3. Compaction Tests: One (1) compaction test location shall be required for each 500 linear feet of pipe and for every 100 square feet of backfill around structures as a minimum. The Utility may determine that more or less compaction tests are required to certify the installation depending on field conditions. The locations of compaction tests within the trench shall be in conformance with the following schedule:

a. One (1) test at the spring line of the pipe.

b. At least one (1) test for each 12-inch layer of backfill within the pipe bedding zone for pipes 24 inches and larger.

c. One (1) test at an elevation of one (1) foot above the top of the pipe.

d. One (1) test for each two (2) feet of backfill placed from one (1) foot above the top of the pipe to finished grade elevation.

4. If this is based on Geotechnical/Soils Engineer testing reports and inspection, and fill which has been placed is below specified density, then the Applicant shall provide additional compaction and testing prior to commencing further construction.

V. Grading: All areas within the limits of construction, including transition areas, shall be uniformly graded to produce a smooth uniform surface. Areas adjacent to structures or paved surfaces shall be graded to drain away from structures and pavement. Ponding shall be prevented. After grading, the area shall be compacted to the specified depth and percentage of maximum density. No grading shall be done in areas where there are existing pipelines that may be uncovered or damaged until such lines have been relocated.

W. Maintenance: The Applicant shall protect newly graded areas from traffic and erosion and keep them free of trash and debris. The Applicant shall repair and reestablish grades in settled, eroded and rutted areas. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, the Applicant shall scarify the surface and reshape and compact it to the required density prior to further construction.

X. Inspection and Quality Assurance: The Applicant shall examine the areas and conditions under which excavating, filling and grading are to be performed, and

not proceed with the Work until unsatisfactory conditions have been corrected. The Applicant shall examine the existing grade prior to the commencement of Work and report to the Utility if the elevations of existing grades vary from the elevations shown on the Drawings.

Y. All Work shall be performed in compliance with applicable requirements of governing authorities having jurisdiction. The Applicant, at his expense, shall engage soil testing and inspection services for quality control testing during earthwork operations. The testing and inspection service shall be subject to the approval of the Utility.

Z. Quality control testing shall be performed during construction to ensure compliance with these specifications. The Applicant shall allow the testing service to inspect and approve fill materials and fill layers before further construction is performed. The Applicant shall give copies of all test results in a report form to the Director to demonstrate compliance with the compaction requirements stipulated in this Handbook.

SECTION 4

MATERIALS

4.01 GENERAL

A. This Section includes the material and installation standards for pipe, fittings, valves and appurtenances, as applicable to water and wastewater installations.

B. The data included herein are to be used as the standards for approved materials indicated under specific facility installations as set forth in other Sections.

C. Materials referred to by brand name in this and other Sections of this Handbook represent specific requirements of the Utility. If desired, requests for substitutions of specified materials shall be made in writing to the Utility prior to construction. Determination of the equivalence of substitute materials will be at the sole discretion of the Utility.

D. When a standard is specified by reference (i.e., AWWA, ANSI, ASTM, etc.), it refers to the latest edition thereof.

E. Required specialty items not included under this Section shall be high quality and consistent with approved standards of the industry for the approved materials indicated under specific facility installations, as set forth in other Sections.

F. Due to recent extensive regulations governing lead and copper content in potable water, the Applicant should carefully observe the current lead and copper rules to ensure conformance.

4.02 PIPE AND FITTINGS

A. General: All pipe and fittings shall be clearly marked with the name or trademark of the manufacturer, the batch number, the location of the plant and strength designation, as applicable.

B. Cast and Ductile Iron:

1. Ductile Iron Pipe (DIP): Pipe shall be in accordance with ANSI standards A21.50 and A21.51, minimum pressure class 350, unless heavier class is required for design conditions.

2. Fittings: Cast and ductile iron pipe fittings shall conform to AWWA C153 compact ductile iron fittings or AWWA C110, minimum pressure class 350.

3. Joints:

a. "Push-On" and mechanical type joints shall be in accordance with ANSI standard A21.1 1.

b. Restrained joint assemblies (with mechanical joint pipe) shall be ductile iron mechanical joint retainer glands as manufactured by American Cast Iron Pipe Company, Clow Corporation or approved equivalent.

c. Flexible type joints shall be of the boltless type, with a joint deflection of 15 degrees, and shall be "Flex-Lok" as manufactured by American Cast Iron Pipe Company, or approved equivalent.

d. Flanged connections shall be in accordance with ANSI standard B 16.1, 125 lb. standard. Full faced type rubber gaskets of an approved quality equivalent to "Rainbow" gaskets 1/16-inch thick, as manufactured by the U.S. Rubber Company, or approved equivalent. Bolts and nuts shall be stainless steel grade B conforming to the ASTM designation A307, for steel machine bolts and nuts and top bolts.

4. Coatings and Linings:

a. Ductile iron pipe and fittings for sewage service, except where special protective linings are required, shall receive an interior and exterior bituminous coating as specified in ANSI specifications A 21.4, A 21.50 or A 21.5 1.

b. Ductile iron pipe and fittings for water service shall receive an exterior bituminous coating as specified above under subparagraph a. and shall be cement mortar lined and bituminous sealed in accordance with ANSI standard A21.4.

c. Pipe and fittings scheduled for field painting shall not receive an exterior bituminous coating. Instead, the pipe and fitting exterior shall be cleaned thoroughly and given one shop coat of rust-inhibitive primer compatible with the field coats and applied in accordance with the paint manufacturer's recommendations.

d. Machined surfaces shall be cleaned and coated with a suitable rust preventive coating at the shop immediately after being machined.

e. Special protective Interior Linings:

i. General - The pipe lining material shall be either a coal tar epoxy or virgin polyethylene. Pipe coatings shall be factory applied at the rate and in the manner specified by the coating manufacturer. The lining shall extend from the plain end of the pipe to the gasket seat of the bell socket. Not less than 5% of the pipe shall be checked for dry mil

thickness, with compliance certification submitted to the Utility.

ii. Coal tar epoxy shall be Koppers Bitumastic 300-M, or approved equivalent, with total thickness of the dry coating a minimum of 20 mils.

iii. Polyethylene lining material shall comply with ASTM designation D1248. The polyethylene shall be fused to the interior of the pipe by heat forming a tightly bonded lining, with minimum 20 mils dry thickness. Said lining system shall be "Polybond", as manufactured by the American Cast Iron Pipe Company, or approved equivalent.

C. Polyvinyl Chloride (PVC):

1. Potable water pipe shall be manufactured from clean virgin Type 1, Grade 1 rigid unplasticized polyvinyl chloride resin conforming to ASTM designation D1784. Potable water pipe 2 inches in diameter or greater shall have the NSF seal, shall conform to AWWA C-900, and shall have a DR of not more than 18, or less if design considerations require.

2. Connections for pipe 2 inches in diameter and larger shall be rubber compression ring type. Pipe shall be extruded with integral thickened bell walls without increase in DR. Rubber ring gaskets shall consist of synthetic compounds meeting the requirements of ASTM designation D1869, and suitable for the designated service. Other connections shall be solvent welded sleeve type joints.

3. PVC pipe and fittings for gravity sewage lines shall be manufactured from polyvinyl chloride resin conforming to ASTM designation D1784. Pipe and fittings of this material shall conform to ASTM designation D3034, "Standard Specification for Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings." All pipe and fittings shall have a SDR of not more than twenty-six (26).

4. PVC pipe for gravity sewers shall be furnished in a maximum of 20-foot lengths, with integrally formed bell joints.

5. All PVC pipe and accessories less than two inches in diameter shall be schedule 80 and be of rigid normal impact polyvinyl chloride. The pipe and accessories shall conform to ASTM specification D 1785 and product standard PS 21-70. All materials to be furnished complete to perform the Work, including solvent cement, etc.

6. Connections: Connection of PVC gravity sewer lines to manholes shall be made by using a PVC manhole coupling adapter connecting piece manufactured from a 2 foot piece of PVC pipe with a waterstop. The

connection shall provide flexibility and a watertight connection at the structure.

D. Concrete Pipe:

1. Reinforced Concrete Pipe (RCP): Pipe shall conform to ASTM designation C 76, "Reinforced Concrete Culvert, Storm Drain and Sewer Pipe", and shall have either a "round" or a flat bottom, "prebed" section. Pipe shall be minimum class III, wall B, with heavier sections as required for design considerations. No lifting holes will be allowed. Joints shall be round "O-ring" rubber gasket type and shall conform to the requirements of ASTM C443. Rubber gaskets shall be of high grade rubber compound resistant to the action of sewage and sewage gases. The assembled joints shall be watertight for internal test pressures of 10 pounds per square inch, and 20 foot external hydrostatic head.

2. Prestressed Concrete Pipe (PCP): Pipe, fittings and specials shall conform to AWWA standard C301, "Prestressed Concrete Pressure Pipe, Steel Cylinder Type, for Water and Other Liquids." Fittings and specials shall be type "B." The pipe interior shall receive a bituminous seal coat as specified in AWWA C104, unless other special protective linings are specified. Gaskets shall be of a material composition suitable for the specific service application. Pipe design shall be in accordance with AWWA C301, for the maximum operational internal pressure and external loading, and the pipe manufacturer shall submit said design calculations.

3. Special Protective Interior Linings:

a. General: Interior surfaces of concrete sanitary sewer pipes shall be protected by the application of an epoxy coating, applied (at the plant where the pipe is manufactured in accordance with the coating manufacturer's specifications. The epoxy coating system shall conform to industry standards.

b. Coating: Prior to coating applications, all interior barrel surface areas shall be sandblasted, in addition to other preparations recommended by the coating manufacturer, in order to remove all extraneous materials. Following said preparation, the coating system shall be applied with a high speed centrifugal spray head in accordance with the coating manufacturer's requirements for application, so as to obtain a continuous, uniform and smooth lining, with a minimum dry film thickness of 25 mils. The joint surface areas shall be coated to obtain a continuous uniform lining with a minimum dry film thickness of 10 mils, but not excessive for proper joining of the pipe. The joint coating shall overlap the barrel coating a minimum of 6 inches.

c. Inspection: The entire coated interior barrel surface areas shall be inspected for holidays with an approved holiday detector. All

holidays shall be marked and repaired. Five percent of the joints of pipe shall be inspected for thickness of the interior barrel coating by taking coupons. One percent of the joints of pipe shall be inspected for adhesion of the interior barrel coating by an approved method.

d. The concrete/coating interface adhesion shall be a minimum of 50 psi tensile stress. All testing areas shall be patched, as required, with material and to the thickness equal to the barrel coating. The pipe manufacturer shall certify in writing as to the class of pipe furnished and conformity with the specifications, including testing results.

E. Plastic Pipe:

1. High Density Polyethyline Pipe: Pipe sizes shall be type "S" smooth interior pipe in conformance with AASHTO M294. Note: Corrugations shall be annual configuration only. The joint system to be used will be integral bell and spigot with a gasket on the spigot end of the pipe over the fist corrugation. The bell should span over two full corrugations at minimum. The pipe bell outside dimensions must conform to that of the pipe. The gasket material to be used should meet ASTM F-477 and be covered with a protective wrap to prevent damage prior to installation. Extruded pipe and blow model fittings – Extruded pipe and blow model fittings shall be made of virgin polyethylene compounds which conform with requirements as defined and described in ASTM D3350.

2. Polyethylene Plastic Pipe: Pipe or tubing shall conform to AWWA C901 and comply with ASTM designations D-1248 (Materials), D-2239 (Pipe) and D2737 (Tubing) be approved for potable water service by the National Sanitation Foundation and bear the NSF seal. The product shall be rated for a minimum working pressure of 150 psi and the SDR shall not exceed 7 for iron pipe size. Fittings shall be brass, equipped with compression type connections, "InstaTite," as manufactured by Mueller Company, Decatur, Ill., or approved equivalent.

F. Special Items:

1. Expansion Joints: Pipe expansion joints shall be suitable for the applicable service with a minimum 150 psi working pressure and shall be style No. 500, as manufactured by Mercer Rubber Company, or approved equivalent.

2. Flanged Coupling Adapters: Units shall be as manufactured by Clow Corporation, Wichita Falls, Texas or approved equivalent, with Type 3521, for pipe sizes to 12 inches, and R.H. Baker Type 602 for larger sizes; and shall be compatible with ANSI standard B16.1, 125 lb. flanges.

3. Cast Couplings: Units shall be as manufactured by Clow Corporation; Wichita Falls, Texas, or approved equivalent as follows: Type 3501 (connecting equal outside diameter); and R.H. Baker Type 240 (reducing coupling). Gaskets shall be suitable for the applicable service conditions.

4. Cast Iron Sleeves and Wall Pipes: Units shall have integral annular ring water-stops, and also conform to other requirements for cast iron fittings specified in this Section. Sleeves and wall pipes to have laying length and ends required for proper installation.

5. Tapping Saddles: Units shall be fabricated of ductile iron and suitable for either wet or dry installation and shall be as manufactured by American Cast Iron Pipe Company, or approved equivalent. The sealing gasket shall be the "Off-Ring" type suitable for the applicable service. Outlet flange shall be ANSI B16.1, 125 lb. standard. Tie straps and bolts shall be stainless steel and double strapped.

6. Tapping Sleeves and Crosses: Units shall be of the mechanical joint type, with outlet flange ANSI B 1 6.1, 125 standard, and shall be Mueller H-615 or American No. 1004 (Tapping Sleeve) and Mueller H-715 or American No. 1001 (Tapping Cross), or approved equivalent.

7. Service Saddles: Saddles shall be as manufactured by Rockwell International Corp., Pittsburgh, Pa., or approved equivalent. Units for cast or ductile iron pipe shall be double strap, ductile iron with polyethylene coat, type 313, and for plastic pipe, types 313 or 352, as applicable. Sealing gaskets shall be suitable for the applicable service and straps shall be stainless steel double strapped.

8. Polyethylene Encasement: Encasement shall comply with the applicable provisions of ANSI standard A21.5, "Polyethylene Encasement for Gray and Ductile Cast-Iron Piping for Water and Other Liquids."

4.03 VALVES

A. General: The valve type, size, rating, flow direction arrow, if applicable, and manufacturer shall be clearly marked on each unit. Valves shall open left (counterclockwise), with an arrow cast in the metal of operating handwheels and nuts indicating the direction of opening.

B. Gate Valves (GV):

1. General: All gate valves shall be resilient seat gate valves and shall be resilient seated, manufactured to meet or exceed the requirements of AWWA C-509. The valve body, bonnet, and bonnet cover shall be cast iron and comply with ASTM A126, class B. The valves shall be non-rising stem with the stem made of cast, forged, or rolled bronze as specified in AWWA C-509. Two (2) stem seals shall be provided and shall be "O-Ring" type. The stem must be independent of the gate. The

resilient sealing mechanism shall provide zero leakage at the system working pressure when installed with the line flow in either direction. All ferrous surfaces inside and outside shall have a fusion-bonded epoxy coating. All nuts, bolts, washers and springs shall be 316 stainless steel. The valves shall have an unobstructed waterway equal to or greater than the full nominal diameter of the valve.

2. Underground Service: Valves shall be iron body, bronze mounted, conforming to AWWA C-509, resilient seat, non-rising stem type, bolted bonnet, mechanical joint, and shall be equipped with 2-inch square cast iron wrench nuts.

3. Above Ground Service: Valves shall be iron body, bronze mounted gate valves, bolted bonnet, flanged, conforming to C-509, resilient seat, with the exception that the valves shall be outside screw and yoke (OS&Y), rising stem type. Valves shall have cast iron handwheels or chain operators with galvanized steel chains, as required.

4. Tapping Valves: Valves shall conform to the specifications set forth under paragraphs 4.03B.1. and 2., for the applicable service conditions. Additionally, units shall be compatible with the connecting sleeve or saddle and specially designed for wet tapping installation operations.

5. Valves two (2) inches and Smaller: Valves shall be bronze, wedge disc, 150-psi minimum working pressure, equipped with wrought steel or cast iron operating handwheels.

6. Actuators: Valves 8 inches and larger shall be equipped with approved gearing actuators with sealed enclosures for buried or submerged service, and shall be furnished by the valve manufacturer. Position indicators shall be furnished as required.

7. Horizontal Installation: Valves 12 inches in diameter or larger, to be installed horizontally, shall be additionally equipped as specified under the applicable section of AWWA C-500 as follows:

   a. Installations in vertical pipe with a horizontal stem shall be fitted with approved slides, tracks and shoes to assist the travel of the gate assembly.

   b. Installations in horizontal pipe with a horizontal stem shall be equipped with approved rollers, tracks and scrapers to assist the travel of the gate assembly and to clear the track of obstructions.

C. Check Valves (CV):

1. General Service: Valves shall be iron body, bronze mounted, stainless steel hinge pin, outside lever and spring operated, swing non-slam type, and equipped with removable inspection covers. Units shall be rated for

150 psi minimum working pressure and shall permit full flow area equal to that of the connecting pipe. Valves shall be figure 60-SL, as manufactured by M & H Valve and Fittings Company, Anniston, Alabama, or approved equivalent.

2. Valves 2-inches and Smaller: Valves shall be bronze body and disc, swing check type, with removable inspection covers, and rated 150 psi minimum working pressure. Valves shall be Crane No. 37, or approved equivalent.

D. Plug Valves (PV): Valves shall be semi-steel body, non-lubricated eccentric type, with resilient faced plugs, and capable of drip-tight shut-off at the rated pressure if applied at either port. Operation of all valves 10 inches or larger and smaller sizes in exposed locations that require handwheels or chainwheels, shall be by approved gear actuators, equipped with position indicator and stop, and shall be furnished by the valve manufacturer. Gear actuators for buried or submerged installations shall be furnished with sealed enclosures. Valves shall be equipped with actuating nuts, cast iron handwheels or chain operators, with galvanized steel chains, as appropriate for the installation and type of operator. Valves and appurtenances shall be Series 100, as manufactured by DeZurik Corporation, Sartell, Minn., or approved equivalent.

E. Butterfly Valves (BFV): These valves are to be used only in special cases that are approved at the sole discretion of the Utility. Valves shall be cast or ductile iron body; alloy cast iron or ductile iron disc; body or disc mounted seat with stainless steel seating surfaces; one-piece stainless steel shaft; short or long body type; with the valve class, shaft size and other special requirements selected in accordance with the specific design; and shall comply with the provisions of AWWA C504, "Rubber Seated Butterfly Valves." Valve operation shall be by approved gear actuators, with sealed enclosures for buried or submerged service. Position indicators shall be furnished, (is required. Units shall be equipped with actuating nuts, cast iron handwheels or chain operators, with galvanized steel chains, as appropriate for the installation. Appurtenances shall be furnished by the Valve manufacturer. Valves shall be as manufactured by American Valve and Hydrant, Pratt or approved equivalent.

F. PVC Ball Valves: Polyvinyl chloride (PVC) ball valves shall be provided, as required, for chemical service installations and shall be full port area, No. 8903, as manufactured by Walworth Company, or approved equivalent.

G. Corporation Stops and Curb Stops: Units shall be brass, equipped with connections compatible with the connecting service pipe type, threaded in accordance with AWWA standard C800, and as manufactured by Mueller Company, Decatur, Ill., or approved equivalent.

H. Sluice Gates: Gates and appurtenances shall comply with the provisions of AWWA standard C501, "Sluice Gates." Type of gate design, materials of construction, method of operation, and other special considerations, shall be as required for the specific installation and service condition. Valve shall be type F-5350 as manufactured by Clow Corporation or approved equivalent.

I. Backflow Preventers: The assembly shall be of the reduced pressure type, with shut-off gate valves provided at each end, and shall comply with the applicable provisions of AWWA standard C506, "Backflow Prevention Devices - Reduced Pressure Principle and Double Check Valve Types." Backflow preventers shall be Beeco Model 6-C as manufactured by Hersey Products, or approved equivalent. Hose-bib vacuum breaker shall be a non-removable unit equivalent to Watts Model 8-A.

J. Air Release Valves - Air and Vacuum Valves:

1. Sewage Service: Valves shall be specially adapted for raw sewage service, cast iron body, with minimum 150 psi working pressure and shall be Model No. 400 (Air Release Valve), Model No. 401 (Air and Vacuum Valves), as manufactured by Valve and Primer Corporation, Chicago, Ill., or Clow 5401 (Air Release Valve), Clow 5402 (Air and Vacuum Valves), or approved equivalent.

2. Water Service (Vent Only): Valves shall be cast iron body or high-density polyethylene, suitable for domestic water service, rated for a minimum 150 psi working pressure, equipped with a vacuum ball to prevent air return and shall be as manufactured by Valve and Primer Corporation, Chicago, Ill., or approved equivalent.

K. Special Items:

1. Water Meters: 5/8-inch through 1-1/2-inch meters shall be sealed register displacement type magnetic drive meters. Meters that are 2 inches and larger shall be "W" turbo-meters. Meters 6 inches and larger are to be equipped with strainer.

2. Floor Stands: Units shall be cast iron, equipped with convenient grease fittings for all lubrication points, and suitable for the applicable operation. Stem guides shall be cast iron, adjustable, with bronze bushings. Items shall be as manufactured by Clow Corporation, M & H Valve and Fittings Company, Rodney-Hunt Machine Company, or approved equivalent.

3. Valve Boxes: Units shall be adjustable, cast iron, minimum interior diameter of 5 inches with covers cast with the applicable inscription in legible lettering on the top: "SEWER", or "WATER." Boxes shall be double size suitable for the applicable surface loading and valve size, and shall be as manufactured by Clow Corporation, M & H Valve and Fittings Company, U.S. Foundry and Mfg. Corporation, or approved equivalent.

4. Meter Boxes: Meter boxes shall be prestressed concrete units of a size comparable with the meter and shall be Brooks 30 series with prestressed concrete lid and reading lid cover.

4.04 INSTALLATION

A. General Requirements:

1. Piping, fittings, valves and appurtenances shall be installed in accordance with these standards, including the attached "Standard Details", and in general with the manufacturer's recommendations for the applicable service.

2. Piping shall be installed along straight line and grade between fittings, manholes, or other defined points, unless definite lines of alignment deflection or grade change have been' established. Modification to approved alignment or grade during construction shall receive prior approval from the Utility, and all resulting design considerations shall be resolved by the Applicant.

3. Materials shall be cleaned and maintained clean, with all coatings protected from damage. The interior of the pipe shall be free of dirt and debris, and when Work is not in progress all open ends shall be plugged. Also, materials for potable water systems including taps, repairs, etc., shall be disinfected in compliance with AWWA C601.

4. Pipe, Valves, fittings, or other items shall be inspected prior to installation, and any items showing a fracture or other defect shall be rejected. Additionally, any pipe or fitting which has received a severe blow that may have caused an incipient fracture, even though not visible, shall also be rejected. However, ductile iron pipe showing an end crack, with no fracture indicated beyond that visible, may be salvaged by cutting off the damaged section 12-inches past, providing the remaining pipe is sound.

5. Underground piping shall not be driven to grade by striking it with an unyielding object. When the pipe has been properly bedded, enough compacted backfill shall be placed to hold the utility in correct alignment. If necessary, precaution shall be taken to prevent flotation.

6. Jointing shall be by an approved method and shall not require undue force to accomplish full satisfactory seating and assembly. Connections to structures shall be cut accurately and worked into place without forcing and shall align with the connecting point. Flanged joints shall be made up tight, but with care taken to prevent undue strain upon equipment or other items. Suitable flange filler rings shall be installed where required to provide suitable joints. The installation shall be permanently watertight, with no visible leakage at joints, connections with structures, or other locations, under operational or testing conditions. Material that in joining does not remain completely seated and/or watertight shall be rejected.

7. Underground pressure piping systems shall be thoroughly braced with restrained joints at fittings, valves, and plugs, as indicated in the attached "Standard Details," unless other restraining designs are applicable.

8. Underground pressure piping system located in the traveled way or planned traveled way shall be installed with 5-feet of cover. However, should this depth not be feasible, ductile iron pipe shall be used with a minimum of 3 feet of cover.

9. Exposed systems shall be supported as necessary to hold the piping and appurtenances in a firm, substantial manner to the required lines and grades indicated, with no undue piping stresses transmitted to equipment or other items. Piping within buildings shall be adequately supported from floors, walls, ceilings or beams. Supports from the floor shall be by suitable saddle stands or piers. Piping along walls shall be supported by satisfactory wall brackets, or saddles, or by wall brackets with adjustable hanger rods. For piping supported from the ceiling, approved rod hangers of a type Capable of screw adjustment after erection of the piping shall be used. Pipe above ground outside of buildings shall be supported on concrete supports.

10. Proper provision for pipe expansion or contraction shall be provided by installation of expansion joints or other suitable methods. Additionally, flexible connections shall be provided to expedite equipment or piping system removal.

11. Subaqueous pipe laying may be permitted where conditions make it impractical to lay pipe "in the dry," provided the Applicant submits his Drawings for laying pipe underwater to the Utility Service Area, and obtains advance approval thereof.

12. Testing of piping systems shall be performed by the Applicant in accordance with the specifications set forth under the standard for the applicable service. Prior to testing procedures, all piping shall be thoroughly cleaned by pigging and flushed with clean water to clear the lines of all foreign matter. This Work shall be done with care to avoid damage to any inside coating.

13. Disinfecting of all potable water pipes shall be accomplished by the Applicant, following approved pressure testing. Unless alternate procedures are set forth under the applicable service standard, said disinfecting procedures shall be in accordance with AWWA standard C601 and as required by the appropriate local approval agency.

B. Ductile Iron Pipe (DIP): Installation shall be performed in accordance with the applicable provisions of AWWA standard C600. The opening cut in the pipe wall for installation of tapping saddles and sleeves shall be mode by a special tapping machine designed for this specific service; however, for dry installations on ductile iron (only), the opening may be made with a cutting torch, with edges ground smooth. All pipe cutting shall be accomplished by power operated abrasive wheel or saw cutters, or other methods approved by the pipe

manufacturer. Where required, polyethylene encasement shall be installed as set forth under ASNI standard A21.5.

C. Polyvinyl Chloride (PVC) Pipe: Lubrication and/or solvent used for pipe and fitting joints shall be non-toxic (NSF approved for potable water). Following making, solvent type joints shall not be disturbed for 5 minutes and shall not have internal pressure applied for 24 hours, or as recommended by the pipe manufacturer.

D. Concrete Pipe:

1. Reinforced Concrete Pipe (RCP): Pipe and fittings shall be installed in accordance with section 430, "Pipe Culverts and Storm Sewers, State of Florida Department of Transportation, Standard Specifications for Road and Bridge Construction", unless special conditions are otherwise approved by the Utility. Connections to manholes or other structures shall be watertight and provide a smooth uniform flow-line, with flexure joint at the outside face of structures. Adjustments to line and grade shall be made only by addition or removal of bedding material (wedging or blocking shall not be used). Following final placement, gaskets shall be checked for proper position, and, if incorrect, the pipe length shall be reset. Pipe shall be cut only with a power driven carborundum saw in accordance with the pipe manufacturer's recommendations and in no case shall openings or cutting be accomplished by other methods.

2. Prestressed Concrete Pipe (PCP): Pipe and fittings shall be handled with care, by means of slings only, and joints shall be protected at all times during the course of installation. Beveled ends shall be carefully placed to conform to the correct abutting angular deflection. Alignment and adjustment shall be obtained by shifting of bedding material, and no blocking or wedging shall be allowed. Prestressed pipe shall not be field cut; factory-made closure pieces shall be provided for this purpose. All gaskets shall be checked for position prior to full insertion in the bell in order to assure final correct jointing. Following full joint insertion, the space outside of the gasket shall be immediately filled with grout, followed by full joint grouting in accordance with the pipe manufacturer's recommendations. Special care shall be taken following grouting to not damage the joint by on-going installation. All exposed metal surfaces of appurtenances shall be covered with a minimum 3/4-inch cement-mortar grout. Defective joints discovered during installation shall be completely re-done; however, method of repair within an existing pipeline shall receive prior approval from the Utility.

3. Special Protective Interior Linings: Prior to installation of each joint of pipe, a permanent non-drying one-component joint compound ("WISE CHEM T-262," as supplied by Wise Chemical Company, or approved equivalent) shall be applied around the inside corner of the pipe bell. The material shall be liberally applied so that when the pipe is made up the joint compound will completely fill and seal the void between bell and

spigot, with an excess extending out of the inside joint. The excess joint compound shall be manually troweled smooth with the inside pipe lining, with special care taken to not damage the factory installed interior lining.

E. Valves:

1. General: Valves shall be carefully inspected, opened wide, and then tightly closed, and all the various nuts and bolts thereon shall be tested for tightness. Special care shall be taken to prevent joint materials, stones or other substances from becoming lodged in the valve seat. Valves, unless otherwise required, shall be set with their stems vertically above the center line of the pipe. Any valve that does not operate correctly shall be adjusted to operate properly or removed and replaced.

2. Buried valves shall be installed vertically where depth of cover permits. Where depth of cover does not permit, the valves shall be mounted horizontally. Extension stems shall be provided on all buried valves when the operating nut is deeper than 4 feet below the final grade, with sufficient stem extension to place the nut not more than 4 feet below grade. Where extension stems are required within valve boxes, approved insert stern guides shall be provided.

3. Valve boxes shall be carefully centered over the operating nuts of underground valves to permit a valve wrench to be easily fitted to the nut. The tops of valve boxes shall be set to the required grade. The valve box shall not transmit surface loads directly to either the pipe or valve. Care shall be taken to prevent earth and other material from entering the valve boxes. A concrete support collar shall be provided for the valve box.

4. Where floor stands and/or extension stems are required, for exposed valves, adjustable wall brackets and extension stems shall be furnished. Generally, brackets shall not be more than 6 feet apart, with floorstands and guides set so that the stems shall run smoothly and in true alignment. Stands and guides shall be firmly anchored to the concrete.

SECTION 5

WATER AND WASTEWATER TREATMENT PLANTS AND WATER STORAGE FACILITIES

5.01 GENERAL

In the event that it is necessary for a developer to construct a water or wastewater treatment plant and/or water storage facility, the Utility will enter into a contract with the developer that will outline specific specifications for these facilities and the eventual conveyance of these facilities to the County.

SECTION 6

WATER TRANSMISSION/DISTRIBUTION SYSTEMS

6.01 GENERAL

This Section sets forth the general requirements for design and installation of water distribution systems for potable and irrigational service.

6.02 DESIGN STANDARDS

A. Required Reference: The Applicant shall comply with the design and installation requirements as established by the FDEP and additional specific requirements stated in this Handbook. The criteria set forth in Part 8 of the "Ten-State Standards - Recommended Standards for Water Works" and Insurance Services Office should be used as a design guide.

B. System Design:

1. Normal Flow Demands: Flow demands for design shall be calculated on the basis of the ultimate development as known, or projected. The ADF for domestic use shall be calculated at the minimum rate of 255 GPD per ERU. Maximum-day demand to be used for design shall use a multiplier of 2.0, and Peak demand shall use a multiplier of 4.0, unless a lesser multiplier is derived based on population projections. Flow demands for commercial, industrial or other special developments shall be established from existing records or by estimated projections, using the best available data.

2. Fire Flow: Minimum system requirements for fire flow rates, duration (time) for total flow, as related to the total ultimate maximum-day demand, shall be designed in conformance with the Insurance Services Office Fire Suppression Rating Schedule, Latest Edition. All fire flow rates and fire protection systems shall also be in complete conformance with applicable local and state fire code regulations. Minimum fire flow rates required for maximum-day demands shall be based on population, density, and/or other hazardous features of the proposed construction, as specifically required.

3. Fire Hydrant Location: Spacing for hydrants located within low density areas shall in no case exceed 1,000 feet (measured along the main) and shall be connected to 8-inch diameter Water Mains minimum, which are of satisfactory loop design. Connection to dead-end stubs are acceptable, providing said stub water main is not less than 8 inches in diameter. Hydrants located in commercial, industrial or other high density areas, shall be spaced no further than 500 feet apart (measured along the main) and shall connect to looped Water Mains 8 inches in diameter, or larger, if

required by the design flow demand. Exact locations of fire hydrants will be in complete conformance with local and state fire code regulations. Where allowed by fire codes, Utility at its sole discretion can adjust the spacing of hydrants.

4. System Size Computation: The minimum design for water distribution systems shall provide for at least 100% of the combined maximum-day demand rate and required fire flow for said rate, with special provisions for peak flows in excess thereof. The allowable minimum service pressure under said design condition shall be not less than 20 pounds per square inch. Design computation shall be by the "Hardy Cross" method, or other applicable methods, as dictated by the system configuration. Design flows and method of computation shall be subject to review and approval.

5. Valve Locations: Valves shall be provided for all branch connections, main ends, fire hydrant stubs or other locations, as required to provide an operable, easily maintained and repaired water distribution system. Valves are to be placed so that the maximum allowable length of Water Main required to be shut-down for repair Work shall be 500 feet in commercial, industrial or high density residential districts, or 1,000 feet in other areas. The Utility at its sole discretion can increase or decrease the spacing.

6. PVC Pipe: PVC piping for Water Mains shall not be used near underground storage tanks, gas stations, and known contamination sites. Ductile Iron Pipe with nitrile gaskets or another acceptable hydrocarbon resistant material shall be used.

6.03 STANDARD REQUIREMENTS

A. Approved Pipe, Fittings and Valves: The types tabulated below, within the size range indicated and for the applicable service, are approved for water distribution system construction:

Pipe and Fittings	Size Range (Inches)
Ductile Iron Pipe (DIP) & Fittings – Cement Mortar Lined	No Limit
Prestressed Concrete Pipe (PCP) & Fittings (Bituminous Interior Seal Coat) - "Special Approval Required"	16-Inch or Larger
Polyvinyl Chloride (PVC) Pipe & Cast Iron Fittings	16-Inch or Less
Brass Fittings	Service Connections Only
Polyethylene Plastic Pipe and Brass Fittings	Service Connections Only

Pipe and Fittings	Size Range (Inches)
Resilient Sealed Gate Valves (GV) - Double-Disc	No Limit
Plug Valves (PV)	No Limit
Butterfly Valves (BFV)	No Limit
Corporation Stops and Curb Stops	Service Connections Only

B. Fire Hydrants:

1. Hydrants shall comply with AWWA standard C502, "Fire Hydrants for Ordinary Water Works Service"; and shall be equipped with a minimum of one (1) pumper outlet nozzle 4½ inches in diameter and two (2) hose nozzles 2½ inches in diameter. Threads, nozzle caps, operating nuts and color shall conform to DeSoto County standards. Units shall be traffic type with breakable safety clips, or flange, and stem, with safety coupling located below barrel break line to preclude valve opening. Outlet nozzles shall be of the same plane, with minimum distance of 18 inches from center of nozzles to ground line. Valve shall be compression type with 5¼ inches minimum valve opening and shoe inlet connection to be 6 inches minimum. Hydrants shall be 5¼-inch Clow Medallion or approved equivalent.
2. Hydrants shall be installed plumb and in true alignment with the connection pipes to the Water Main. They shall be secured with restraining assemblies. The gravel or crushed stone for the drain sump, followed by backfilling, shall be carefully placed and compacted.

C. Detector Checks: Detector check assemblies shall be Wilkins Detector Check with complete bypass assembly, housed in a Brooks precast concrete meter vault with cover and meter reading lid.

D. Joint Restraining: Pressure piping fittings and other items requiring restraint, shall be braced with restraining assemblies, as specified under Section 3. Said restraining devices shall be designed for the maximum pressure condition (testing) and the safe bearing loads for horizontal thrust, if thrust blocking is used.

E. Pipe Depth and Protection: The standard minimum cover for water distribution systems shall be 3 feet from the top of the pipe to finish grade. Should this design not be feasible, alternatives shall be reviewed for acceptance.

F. Connections at Structures: Where pipes are to extend into or through structures, flexible joints shall be provided at the wall face.

G. Special Exterior Protection for Corrosion: Extra protection shall be provided for underground ductile iron pipe and fittings within areas of sever corrosive conditions. This shall be accomplished by the installation of polyethylene encasement, through the area of concern. The soil-test evaluation to determine the necessity for extra protection in suspect areas shall be as set forth in ANSI

standard A21.5. Additionally, where other existing utilities are known to be cathodically protected, DIP crossing said utility shall be protected for a distance of 20 feet to each side, and when installed parallel to and within 10 feet of, protection shall also be provided.

H. Air Venting and Blow-Offs: Where the water main profile is such that air pockets or entrapment could occur, resulting in flow blockage, methods for air release shall be provided. Air venting capabilities shall be provided for distribution mains by appropriately placing fire hydrants, blow-offs or other manual devices. At critical points on major mains, automatic air release assemblies shall be installed, with valves as specified under Section 4. All dead-end Water Mains, temporary or permanent, shall be equipped with a manually operated blow-off at the terminus.

I. Service Connections: Connections to Water Mains (other than DIP), of 4 inches and larger, shall be made by the drilling of the appropriate size hole and the installation of service saddles. Services to smaller size mains shall be accomplished by in-line fittings. A corporation stop shall be placed at the saddle or fitting, with the service line extended perpendicular to said line.

J. Identification Tape: Locating tape capable-of registering on a metal locator shall be installed directly above the pipe center line of all non-metallic pipe and buried to a minimum of 6 inches and a maximum of 12 inches. The tape shall be laid continuously without gaps between ends over all installed piping. The tape shall have the words "Caution, Water Line Buried Below" printed continuously along its length and shall be as manufactured by Lineguard, Inc., or approved equivalent.

6.04 EXCAVATION

A. Excavating for Structures and Utilities:

1. Excavation Work shall be performed in a safe and proper manner with appropriate precautions being taken against all hazards. Excavations shall provide adequate working space and clearances for the Work to be performed therein. In no case shall excavation faces be undercut for extended footings.

2. Excavation shall be made to such dimensions as will give suitable room for bracing and supporting, for pumping and draining, for installing the pipelines, and for all other Work required.

   a. Excavation for precast or prefabricated structures shall be carried to an elevation two (2) feet lower than the proposed outside bottom of the structure to provide space for the backfill material.

   b. Excavation for structures constructed or cast-in-place in dewatered or dry excavations shall be carried down to the 2 feet below the bottom of the structure where dewatering methods are such that a

dry evacuation bottom is exposed and the naturally occurring material at this elevation leveled and left ready to receive construction. Material disturbed below the founding elevation in dewatered excavations shall be replaced with class B concrete.

3. The bottom of excavations shall be rendered firm and dry before placing any structure or pipe. Excavated material not suitable for backfill shall be removed from the site and disposed of by the Contractor in a legal manner.

4. Excavated material shall be stockpiled in such a manner as to prevent nuisance conditions. Surface drainage shall not be hindered.

6.05 FILL AND COMPACTION

A. Placement and Compaction:

1. Backfill materials shall be placed in approximately horizontal layers not to exceed 8 inches in uncompacted thickness. Material deposited in piles or windrows by excavating and hauling equipment shall be spread and leveled before compaction.

2. Each layer of material being compacted shall have the best practicable uniform moisture content to ensure satisfactory compaction. Each layer beneath structures, paving and parkways shall be thoroughly compacted by rolling or other method acceptable to the Utility to 98 percent of maximum density at optimum moisture content by modified proctor method, ASTM D1557. All other compaction shall be 95 percent modified proctor method, except as otherwise required or determined by the County.

3. Whenever a trench passes through a backfill or embankment, material shall be placed and compacted to an elevation 12 inches above the top of the pipe before the trench is excavated.

B. Excavations shall be backfilled to the original grade or as indicated. Deviation from this grade because of settling shall be corrected. Backfill operation shall be performed to comply with all rules and regulations and in such a manner that it does not create a nuisance or safety hazard.

6.06 PLACING OF FLOWABLE FILL

A. Production Requirements: Flowable fill shall be produced and delivered using concrete construction equipment. Placing flowable fill shall be by chute, pumping or other methods approved by the Utility.

B. Construction Requirements: The flowable fill shall be placed to the designated fill line without vibration or other means of compaction. Placement shall be avoided during inclement weather, e.g. rain or ambient temperatures below 40 degrees F.

C. Acceptance: The flowable fill shall be proportioned and placed as specified herein. In general, the strength desired is the maximum hardness that can be excavated at a later date using conventional excavating equipment. No curing protection is required. The fill shall be left undisturbed until material obtains sufficient strength. Sufficient strength is 250 psi penetration resistance as measured using a hand held penetrometer. The penetrometer shall be provided by the Contractor. All flowable fill areas subjected to traffic loads must have a durable riding surface.

6.07 TRENCH EXCAVATION

A. The Contractor shall not open more trench in advance of pipe laying than is necessary to expedite the Work. Four hundred (400) feet shall be the maximum length of open trench on any line under construction. All trench excavation shall be open cut from the surface.

1. Alignment, Grade, and Minimum Cover: The alignment and grade or elevation of each pipeline shall be fixed and determined from offset stakes. Vertical and horizontal alignment of pipes, and the maximum joint deflection used in connection therewith shall be in conformity with requirements of the Section covering installation of pipe 4.04.

2. Where pipe grades or elevations are not definitely fixed, trenches shall be excavated to a depth sufficient to provide a minimum depth of backfill cover over the top of the pipe of 42 inches where in paved or graded streets where surface grades are definitely established and 36 inches in other locations. Greater pipe cover depths may be necessary on vertical curves or to provide necessary clearance beneath existing pipes conduits, drains, drainage structures, or other obstructions encountered at normal pipe grades. Measurement of pipe cover depth shall be made vertically from the outside top of pipe to finished ground or pavement surface elevation.

B. Mechanical Excavation:

1. The use of mechanical equipment will not be permitted in locations where its operation would cause damage to trees, buildings, culverts, and other existing property, utilities, or structures above or below ground. In all such locations, hand excavating methods shall be used.

2. Mechanical equipment used for trench excavation shall be of the type, design, and construction, and shall be so operated, that the rough trench excavation bottom elevation can be controlled, that uniform trench widths and vertical sidewalls are obtained at least from an elevation one foot above the top of the installed pipe to the bottom of the trench, and that trench alignment is such that pipe when accurately laid to specified alignment will be centered in the trench with adequate clearance between

the pipe and sidewalls of the trench. Undercutting the trench sidewall to obtain clearance will not be permitted.

6.08 TESTING

A. The Applicant shall perform hydrostatic testing of all water distribution systems, as set forth in the following, and shall conduct said tests in the presence of representatives from the County, with five (5) days advance notice provided.

B. Piping and appurtenances to be tested shall be within sections between valves, unless alternate methods have received prior approval. Testing shall not proceed until concrete thrust blocks are in place and cured, or other restraining devices installed. All piping shall be thoroughly cleaned and flushed prior to testing to clear the lines of all foreign matter. While the piping is being filled with water, care shall be exercised to permit the escape of air from extremities of the test section, with additional release cocks provided if required. Flushing shall be at full flow conditions and at least 2.5 feet per second flow rate.

C. Hydrostatic testing shall be performed at 150 pounds per square inch pressure, unless otherwise approved, for a period of not less than two (2) hours. Testing shall be in accordance with the applicable provisions as set forth in section 4 of AWWA standard C600. The allowable rate of leakage shall be less than the number of gallons per hour determined by the following formula:

$$L = \frac{ND \times (P)^{1/2}}{7{,}400}$$

L = allowable leakage in gallons per hour

N = number of joints in the section tested

D = normal diameter of the pipe in inches

P = average test pressure maintained during the leakage test in pounds per square inch gauge, min. 150 psi

For 150 psi test: L = 0.00166 ND

D. The testing procedure shall include the continued application of the specified pressure to the test system, for the two hour period, by way of a pump taking supply from a container suitable for measuring water loss. The amount of loss shall be determined by measuring the volume displaced from said container.

E. Should the test fail, necessary repairs shall be accomplished by the Applicant and the test repeated until within the established limits. The Applicant shall furnish the necessary labor, water, pumps, gauges and all other items required to conduct the required water distribution system testing and perform necessary repairs.

6.09 DISINFECTION

A. Following pressure testing, the Applicant shall disinfect all sections of the water distribution system, and receive approval thereof from the appropriate agencies, prior to placing in service. Advance notice shall be provided to the Utility before disinfecting procedures start. The disinfection shall be accomplished in accordance with the applicable provisions of AWWA standard C601, "Disinfecting Water Mains", and all appropriate approval agencies.

B. Care shall be taken to provide disinfection to the total system and extremities shall be carefully flushed to accomplish this end. After disinfection has been accomplished, samples of water for bacteriological analysis shall be collected and submitted to and as directed by the Florida Division of Health or other appropriate approval agency. Should these samples or subsequent samples prove to be unsatisfactory as determined by the Florida Division of Health, then the piping shall be disinfected until a sufficient number of satisfactory samples are obtained.

C. The Applicant shall furnish all equipment and materials and perform the Work necessary for the disinfecting procedures, including additional disinfection as required.

D. All internal parts on tapping machines, such as cutting heads, etc., will be disinfected in compliance with AWWA C601, prior to making any tap.

SECTION 7

SANITARY GRAVITY SEWERS

7.01 GENERAL

This Section includes general technical criteria for the design and installation of sanitary gravity sewerage systems.

7.02 DESIGN STANDARDS

A. Required Reference: The Applicant shall comply with the applicable requirements as established by the FDEP. Additionally, the criteria set forth in Chapter 30, "Wastewater Facilities", of the "Ten-State Standards - Recommended Standards for Sewage Works", may generally be used as a design guide, if not in conflict with State, County or other regulatory agency requirements.

B. System Design:

1. Average Design Flows: The sewer system design shall be based on full ultimate development as known, or projected. The ADF from domestic units shall be calculated at the minimum rate of 100 gallons per capita per day. One ERU shall be equal to the rate of 215 GPD. Flow requirements from commercial, industrial, institutional, or other special development areas shall be established from existing records, or estimated using Florida Administrative Code 10D-6 or based on commercial/industrial land use of 2,500 GPD per acre. The progressive summation of the previously described contributions shall constitute the ADF for specific sections of the sewer system.

2. Peak Design Flows: Gravity sewers shall be designed on the basis of ultimate development maximum rates of flow, which will be the product of selected peak factors times the accumulative ADF for the subject portion. In general the following peak factors shall be applicable for the range of average daily flow rates indicated MGD, unless larger values are required for specific conditions or prior approval is received for modification thereof.

Flow Range	Peak Factor
0.0 to 0.100 MGD-ADF	4.0
0.100 to 0.250 MGD-ADF	3.5
0.250 to 1.000 MGD-ADF	3.0
1.000 to 4.000 MGD-ADF	2.5

Note: Special analysis shall be made for flows beyond 4.000 MGD-ADF or peak factors less than 2.5.

3. Sewer Size Computation: Sanitary sewers shall be sized to provide ample capacity for the required peak flow rates. The minimum allowable size for any sewer, other than service connections, shall be 8 inches in diameter. All sewers shall be designed at slopes providing minimum velocities of not less than 2 feet per second when flowing full or half-full. Said computation shall be based on Manning's Equation, using a roughness coefficient ("n") of not less than 0.013, unless justifiably approved otherwise. In general, the following minimum slopes shall be provided:

Sewer Diameter	Minimum Slope (Feet per 100 Feet)
8 inches	0.40
10 inches	0.28
12 inches	0.22
14 inches	0.17
15 inches	0.15
16 inches	0.14
18 inches	0.12
20 inches	0.11
21 inches	0.10
24-inches and larger	0.08

Minimum slopes slightly less than those indicated may be considered; providing the depth of flow will not be less than 0.3 of the pipe diameter or the velocity less than 1.6 feet per second at design average daily flow, and justifiable reasons for the modification are presented.

4. Design Considerations:

   a. Sewers shall be installed with straight alignment and grade between manholes, with manhole spacing not to exceed 400 feet for sewers 15 inches or less, and 500 feet for sizes larger; however, special provisions may be considered for sizes 30 inches and larger.

   b. All sanitary sewers shall initiate and terminate at manholes.

   c. Sewers of diverse sizes shall always join at manholes, with no size conversions between. Where different sizes join, the pipes shall be placed at elevations where the 0.8 depth points are equal. If the entrance pipe elevation exceeds 2.0 feet above the effluent sewer, drop manhole connections shall be provided.

d. Flow direction changes in excess of 90 degrees shall not be included in sewer alignments without special consideration. Where possible, when directional changes exceeding 45 degrees occur, an extra flow line elevation drop (0.1 ft.) across manholes shall be provided.

e. Where design velocities greater than 10 feet per second are attained, due to topography or other reasons, special provisions shall be provided for sewer protection.

f. Connections at manholes shall be made by a flexible connection. The Kor n' Seal rubber boot is preferred. The connection should be grouted inside and out.

g. The Applicant shall not install any pipe that is bent, curved, damaged, or otherwise unsuitable for installation.

7.03 STANDARD REQUIREMENTS

A. Approved Pipe: The types tabulated below, within the size range indicated, are approved for sanitary gravity sewer construction:

Pipe and Fittings	Size Range (Inches)
Ductile Iron Pipe (DIP) & Fittings -	
(*) Interior Bituminous Coating	16 Inches or Less
(*) Special Protective Interior Linings	18 Inches or Larger
Polyvinyl Chloride (PVC)	12 Inches or Less
Reinforced Concrete Pipe (RCP) & Fittings – Special Protective Interior Linings – "Special Approval Required"	30 Inches or Larger

(*) Interior coating or lining requirements shall receive special consideration in regard to operational conditions.

B. Sanitary Sewer Manholes:

1. Manholes shall be precast concrete or brick, as detailed herein. Alternate manhole materials and designs shall receive prior approval. The minimum inside diameter of manholes shall be 48 inches for sewer sizes to 21 inches in diameter or less, with submittal of special designs for larger pipes.

2. Precast reinforced manholes shall be in accordance with ASTM designation C478, with performed flexible plastic joint sealer conforming to federal specification SS-S-0021 (GSA-FSS), "Ram-Nek", as manufactured by the K.T. Snyder Company, Inc., Houston, Texas, or approved equivalent.

3. Manhole frames and covers shall be gray cast iron conforming to ASTM designation A48, Class 30, and shall be U.S. Foundry and Manufacturing Corporation, No. 430 (No. 540 for use in travel ways) or approved equivalent. Covers shall have no perforations and shall be marked with the word "SANITARY." Frames and covers shall be fully bedded in mortar to the correct finish grade elevation, with adjustment brick courses placed below, for precast manholes. Frames shall be suitable for the future addition of cast iron rings for upward adjustment of top elevation.

4. Manhole flow channels shall be smooth with carefully shaped bottoms, built up sides and benching constructed from concrete. Channels shall conform to the dimension of the adjacent pipe and provide changes in size, grade and alignment evenly.

5. The interior surfaces of all manholes shall be protected by the application of two (2) coats of Kop-Coat Bitumastic No. 300M, or approved equivalent, applied at the rate of one gallon per 120 sq. ft. per coat (minimum). Exterior surfaces shall receive two (2) coats of Kop-Coat Bitumastic Black Solution, or approved equivalent, for moisture protection, applied at a minimum rate of one gallon per 375 sq. ft. per coat. Surface preparation and point application shall comply with the manufacturer's recommendations.

6. Where additional pipe connections or modification of existing factory made openings are required on new or existing precast concrete manholes, all cutting relative thereto shall be performed only by a power driven abrasive wheel or saw. It is specifically noted that such connections to existing manholes shall be caulked watertight with non-shrinking grout.

C. Pipe Depth and Protection: The minimum allowable cover for gravity sewers shall be 3 feet from the top of the pipe to finish grade. However, should this depth not be feasible, where grade depressions along the alignment are unavoidable, protective concrete slabs shall be provided over the pipe within the limits of the lesser cover. In no case shall pipe cover be less than 18 inches, unless special design considerations have been approved. Where waterways are crossed, DIP and protective concrete slabs shall be installed across and to 10 feet each side of the bottom. Additionally, approved utility crossing signs shall be placed on the pipe alignment at each side of any waterway crossed.

D. Pipe Bedding: Special care shall be exercised in design and installation to provide adequate bedding for the type of pipe used, taking into consideration trench width and depth, superimposed loadings above grade and the material below trench grade. Pipe loading capabilities shall be computed in accordance with established design criteria and special supporting bedding or facilities shall be provided as required.

E. Special Exterior Protection for Corrosion: Extra protection shall be provided for underground DIP and fittings within areas of severe corrosive conditions. This

shall be accomplished by the installation of polyethylene encasement, as specified in Section 4.04(B), through the area of concern. The soil-test evaluation to determine the necessity for extra protection in suspect areas shall be set forth in ANSI standard A21.5. Additionally, where other existing utilities are known to be cathodically protected, DIP crossing said utility shall be protected for a distance of 20 feet to each side; and, when installed parallel to and within 10 feet of same, protection shall also be provided.

F. Connections at Structures: Where sanitary sewers connect to structures, pipe joints shall be provided at the wall face; and further, where said connection is to wet wells or other installations where backfill exists below trench grade, one joint (18 to 20 feet) of DIP shall extend outward from the structure. When it is necessary to extend sewers through structures, such as conflicting elevation storm drain by-passing chambers, the pipe within shall be ductile iron with no inside joints.

G. Transition Connections: Where pipes of alternate materials (PVC to DIP, etc.) are to be connected between manholes, suitable approved transition couplings shall be installed. Couplings shall be "C-T Adapters" as manufactured by Can-Tex Industries, Mineral Wells, Texas, or approved equivalent. Special designed units may be submitted for approval; however, concrete collars are not acceptable.

H. Service Connections: Installation shall be as shown on "Service Connection Details;" including the wye branches installed in the sewer main at the point of connection, and the service pipe and required fittings extended to the property line, perpendicular to said line, terminating with stoppered ends or fittings, as indicated. The minimum service pipe size shall be 6 inches in diameter and not more than 50 feet in length for single or double connections. On curbed streets the exact location for each installed service shall be marked by etching or cutting an "S" in the concrete curb. Where no curb exists or is planned, locations shall be adequately marked by a method approved by the Utility.

I. Protection of Water Systems: The horizontal separation between sanitary sewers and existing or proposed Water Mains shall not be less than 10 feet. However, should the stipulated horizontal separation not be possible, the sewer pipe shall be completely encased (6 inches minimum) in concrete, or constructed of ductile iron with pressure-tight joint, or protected by other methods as approved by the Utility. Unless sewer pipes cross below Water Mains with a vertical separation of 18 inches between the bottom of the water pipe and the top of the sewer, special protection shall be provided. Said protection shall consist of completely encasing (6 inches minimum) the sewer pipe in concrete for a minimum distance of 10 feet each side of the Water Main, or installation of pressure-tight joint of DIP for the same dimension.

7.04 TESTING

A. The Applicant shall perform testing of all sanitary gravity sewers, as set forth in the following, and shall conduct said tests in the presence of representatives from the County with five (5) days advance notice provided.

B. The installed sewers shall be "lamped" between manholes **[Is a citation needed here?]**, or other structures in order to ascertain that they are clear and to correct alignment. The concentricity of the lamp image received shall be such that the diameter of said image shall have no vertical reduction from that of the pipe inside diameter and not more than 20 percent (20%) horizontal reduction.

C. Sanitary sewers to be tested shall be within sections as designated by the Utility. Testing shall not proceed until all facilities are complete in place and concrete cured. All piping shall be thoroughly cleaned prior to testing to clear the lines of all foreign matter.

D. The water tightness of a sewer that has a crown lying below ground-water level shall be tested by measuring the infiltration. The water tightness of sewers having a crown 1 inch-or more above ground water level shall be tested by filling the pipe with water to produce a hydrostatic head of two feet or more above the crown of the sewer at the upper end of the test section or the water table outside of the sewer, whichever is higher, and then measuring the exfiltration. The infiltration or exfiltration shall not exceed 0.10 gallons/inch of diameter/hour/100 feet of line when field tested by actual infiltration conditions. If exfiltration testing is required an allowance of an additional 10 percent of gallonage shall be permitted for each additional 2-ft. head over a basic 2-ft. minimum internal head.

E. Maximum ring deflection of PVC pipe under load shall be limited to five percent (5%) of the vertical internal pipe diameter.

F. Testing shall proceed for a continuous period of two (2) hours, with exfiltration or infiltration amounts measured by approved methods. Upon application of internal hydrostatic pressure for exfiltration testing, care shall be taken to preclude unseating the joint gaskets for a specific type of pipe by exceeding the pressure capability thereof.

E. Should the test fail, necessary repairs shall be accomplished by the Applicant and the test repeated until the results are within the established limits. The Applicant shall furnish the necessary labor, water and all other items required to conduct the required testing and shall perform the necessary system repairs required to comply with the specified test.

SECTION 8

WASTEWATER FORCE MAINS

8.01 GENERAL

This Section includes the general requirements for design and installation of force main systems servicing sanitary sewage pumping stations.

8.02 DESIGN STANDARDS

A. Required Reference: The Applicant shall comply with the applicable design and installation requirements as established by the FDEP.

B. System Design: Force main systems shall be of adequate size to efficiently transmit the total ultimate peak operational flows, applied by the connected sewage pumping station(s), to the point of collection with the Utility's wastewater system. Consideration shall be given to possible future connecting pumping stations and the County representatives shall review this probability. Capacity computations shall be coordinated with the proposed pumping system(s) along with any future flow requirements, if applicable. Force main flow velocity shall not be less than 2 feet per second to provide adequate pipeline cleansing.

C. Operational Cost Considerations: In addition to initial capital expenditure, long term pumping station operational costs shall also receive consideration when sizing force main systems. Should a pipe size option be available within the design limits, the cost of sewage pumps and motors, force main system and pump operating power (computed for design average daily flow rate for 10 years at existing electricity cost), shall be compared to like amounts for the alternate designs. The final force main size selection shall be directed towards the system with the least long range capital and operational cost. Said cost analysis shall be subject to review.

8.03 STANDARD REQUIREMENTS

A. Approved Pipe, Fittings and Valves: The types tabulated below, within the size range indicated and for the applicable service, are approved for sanitary sewage force main construction (force main shall be a minimum of 4 inches in diameter).

Pipe and Fittings	Size Range (Inches)
Polyvinyl Chloride (PVC) Pipe & Cast Iron Fittings-	12 Inches or Less
Ductile Iron Pipe (DIP) & Fittings –	
(*) Interior Bituminous Coating	16 Inches or Less
(*) Special Protective Interior Linings	18 Inches or Larger

Prestressed Concrete Pipe (PCP) & Fittings - (Special Protective Interior Linings Required) - "Special Approval Required"	30 Inches or Larger

Valves	Size Range Inches
Gate Valves (GV) - Solid-wedge	No Limit
Plug Valves (PV)	No Limit

B. Joint Restraining: Pressure piping fittings and other items requiring restraint, shall be braced with thrust blocks or restraining assemblies. Said restraining devices shall be designed for the maximum pressure condition (testing) and the safe bearing loads for horizontal thrust, if thrust blocking is used.

C. Pipe Depth and Protection: The standard minimum covers for sewage force main systems shall be 3 feet from the top of the pipe to finish grade. However, should this design not be feasible, protective concrete slabs shall be provided over the pipe within the limits of the lesser cover. Where waterways, canals, ditches or other cuts are crossed, protective concrete slabs shall also be installed across and to 10 feet each side of the bottom. Additionally, approved utility crossing signs shall be placed on the pipe alignment at each side of the canal, etc.

D. Connections at Structures: Where pipes are to extend into or through structures, flexible joints shall be provided at the wall face.

E. Special Exterior Protection for Corrosion: Extra protection shall be provided for underground DIP and fittings within areas of severe corrosive conditions. This shall be accomplished by the installation of polyethylene encasement, through the area of concern. The soil-test evaluation to determine the necessity for extra protection in suspect areas shall be as set forth in ANSI standard A21.5. Additionally, where other existing utilities are known to be cathodically protected, DIP crossing said utility shall be protected for a distance of 20 feet to each side; and, when installed parallel to and within 10 feet of same, protection shall also be provided.

F. Air and Vacuum Venting: Where the force main profile is such that air pockets or entrapment could occur, resulting in flow blockage, provisions for air release shall be provided. Manually operated vent valves shall be provided along minor force mains where continual problems are not anticipated. Automatic air release assemblies shall be installed, where venting is required, on all major force mains and at critical points on lesser mains. At profile break points on major force mains, such as tops of hills, etc., where free flow will occur during operation or after pumping stops, combined air release and vacuum valve assemblies shall be provided. Air and vacuum valves shall be suitably housed in a properly vented underground chamber (manhole), if in an open area.

G. Valve Locations: Valves shall be installed on all subsidiary force mains at the point of connection to the major main, in order to isolate said pipeline for maintenance. Where force mains are to be extended, valves shall be placed at the future connection point, to preclude line shutdown at the time of extension. At future connection branches or ends, the valves shall be restrained by methods other than thrust blocking in order to facilitate said connection without system shut-down. Generally, valves shall not be installed within the run of individual force mains, nor for pipe sizes in excess of 14 inches, without special approval of the Utility.

H. Branch Connections: Where the receiving force main liquid transmission sectional area is less than four times (4x) that of the subsidiary main, connections shall be through wye fittings. Where within the allowable range (receiving main sectional area more than four times that of the branch), tee fitting connections are acceptable, with tapping saddles recommended for receiving mains 24 inches and larger.

I. Alignment Direction Change: When changes in the direction of alignment are required, fitting angles shall not exceed 45 degrees, unless specific design considerations dictate otherwise. For example, at a 90-degree turn, two 45-degree bends will be used in place of one 90-degree bend.

J. Clean-Out Connections: Should force mains appear to be susceptible to sedimentation clogging, as created by depressed crossings or extended low flow (velocity) periods, suitable clean-out connections shall be provided. Said clean-outs, such as plugged wye or tee fittings, shall-be located to facilitate this maintenance operation.

K. Terminal Discharge: Force mains shall enter the terminal facility (gravity sewer, manhole, pumping station wet well or other) at a point equal to the operational water level of said receiving unit. Should an elevation drop be required to obtain the outlet connection, the prior down-slope of the force main shall not exceed 45 degrees, and adequate air venting shall be provided at the profile break-point.

L. Identification Tape: Locating tape capable of registering on a metal locator shall be installed directly above the center line of all non-metallic pipe and buried a minimum of 6 inches and a maximum of 12 inches. The tape shall be laid continuously without gaps between ends over all installed piping. The tape shall have the words "CAUTION: SEWER LINE BURIED BELOW" painted continuously along its length and shall be as manufactured by Lineguard, Inc., or approved equivalent.

M. PVC Pipe: PVC piping shall not be used near underground storage tanks, gas stations, and known contamination sites.

8.04 TESTING

A. The Applicant shall perform hydrostatic testing of all sanitary sewage force mains, as set forth in the following, and shall conduct said tests in the presence of

representatives from the Utility and/or other authorized agencies, with five (5) days advance notice provided.

B. Piping and appurtenances to be tested shall be within sections between valves or adequate plugs, with prior approval. Testing shall not proceed until concrete thrust blocks are in place and cured, or other restraining devices installed. All piping shall be thoroughly cleaned and flushed prior to testing to clear the lines of all foreign matter. While the piping is being filled with water, care shall be exercised to permit the escape of air from extremities of the test section, with additional release cocks provided if required.

C. Hydrostatic testing shall be performed at 150 percent of the maximum operating pressure of the tested system, or connected sewage pump shut-off pressure, or 75 psi for 18-inch diameter pipe and less, or 50 psi for 20-inch diameter pipe and larger, whichever value is greater. The testing procedure shall continue for an uninterrupted period of not less than two (2) hours. Testing shall be in accordance with the applicable provisions as set forth in section 13 of AWWA standard C600. The allowable rate of leakage shall be less than the number of gallons per hour determined by the following formula:

$$L = \frac{ND \times (P)^{1/2}}{7{,}400}$$

L = allowable leakage in gallons per hour
N = number of joints in the section tested
D = normal diameter of the pipe in inches
P = average test pressure maintained during the leakage test in pounds per square inch gauge, min. 150 psi

For 50 psi Test: L = 0.00096 ND
For 75 psi Test: L = 0.00117 ND

D. The testing procedure shall include continuous application of the specified pressure to the test system, for the two hour period, by way of a pump taking supply from a container suitable for measuring water loss. The amount of loss shall be determined by measuring the volume displaced from said container.

E. Should the test fail, necessary repairs shall be accomplished by the Applicant and the test repeated until within the established limits. The Applicant shall furnish the necessary labor, water, pumps, gauges and all other items required to conduct the required sanitary sewage force main testing and shall perform the necessary system repairs required to comply with the specified hydrostatic test.

SECTION 9

WASTEWATER PUMPING STATIONS

9.01 GENERAL

This Section includes the general requirements for the design criteria and installation of sewage pumping stations. The County will not accept any lift station, unless it is a master lift station designed to the standards of the Utility. Lift stations that are not master lift stations shall only be permitted with the approval of the Utility and shall not be conveyed to the County, but operated and maintain in perpetuity by the Customer.

9.02 DESIGN STANDARDS

A. Required Reference: The Applicant shall comply with the applicable requirements established by the FDEP. Additionally, the criteria provided in Chapter 40, "Wastewater Facilities," of the "Ten-State Standards--Recommended Standards for Sewage Works," may generally be utilized as design guidelines, if not in conflict with State, County or other regulatory agency requirements.

B. Design Flows: Sewage pumping stations shall be designed for the total ultimate development flow from all contributory areas. Said contributions shall include the immediate gravity system, subsidiary sources and known or projected future development within the designated station service area. The design ADF shall be computed at the unit rates set forth herein. The maximum required pumping capability shall be the product of selected peak factors multiplied by the accumulative ADF from the total service area. In general, the following factors shall be applicable for the range of flow contributions indicated (MGD-ADF), unless larger values are required

Flow Range	Peak Factor
0.0 to 0.05 MGD-ADF	4.5
0.05 to 0.25 MGD-ADF	3.5
0.25 to 2.00 MGD-ADF	2.5

Note: Special analysis shall be made for flows beyond 2.00 MGD-ADF and peak factors less than 2.5.

C. Pump Selection:

1. For pumping stations with a maximum flow demand of 1500 GPM or less, a minimum of two pump units shall be provided. Where the peak design flow exceeds 1500 GPM, three or more units shall be included in the facility. In all cases stand-by pumping capability shall be provided, such that if any one pump is out of service, an alternate unit is available at equal or greater capacity.

2. The selected sewage pump system shall have the minimum capability of pumping the design peak flow at the maximum computed system TDH requirements.

3. Head-capacity curves shall be prepared for the proposed pumping system in order to determine the various operational conditions. Hydraulic computations shall be in accordance with good engineering practice, with pipe friction loss calculated by the "Hazen-Williams Formula", using standard friction factors based on the material utilized; however, not greater than "C=120", unless the justification for higher values are approved by the Utility. The system head-capacity analysis shall provide the following and be subject to review:

   a. System operation under peak flow conditions, with one pump or multiple parallel pumping, as designed (Should the receiving force main system be interconnected to additional pumping stations, hydraulic design conditions shall also include these pumping systems operating at rated capacity.);

   b. Pumping capability with one pump running, all units operating in parallel and other combinations, if applicable; and

   c. For multiple pumping station force main systems, the one pump maximum capacity under minimum flow contribution conditions from the other connected facilities shall be calculated.

D. Wet Well Design: The wet structure shall provide a capacity, between operational water levels, sufficient to allow a minimum of ten (10) minutes between successive starts of the pumps, under the following condition: Influent rate of one-half the maximum one pump capacity and, one pump running at said maximum. Additionally, wet wells shall provide sufficient space for installed equipment, required suction pipe submergence and spacing, and shall not be less than six (6) feet in minimum horizontal dimension or provide less than thirty-six (36) inches between shut-off (low water) and lead pump start levels. Low water levels shall provide adequate submergence to preclude pump inlet vortexing or air binding. In general, the normal operational water level shall provide a positive suction head for the sewage pumps. Operational maximum or high water levels shall not exceed the invert elevation of the lower influent pipe, with high water alarm no higher than the 0.5-foot point of said pipe. A minimum size hopper bottom shall be provided, with the wet well floor sloping to said bottom at a slope of not less than one to one (1:1).

E. Ventilation: Wet wells for submersible installations or others, without free access, shall be ventilated with not less than one (1) 4-inch diameter open vent pipe. **[Should there be any mechanical ventilation requirements here?]**

F. Site: Pumping stations shall be installed outside the public right-of-way, in readily accessible sites, and shall have substantial area provided for operation and maintenance of the facility. The site shall have adequate space available to

accommodate utility trucks with trailers and small tankers as needed to provide maintenance. The site shall be well drained and not subject to flooding. Pumping stations to be conveyed to the County shall be on land that is not subject to title encumbrances and shall be conveyed to the County in fee. If such fee parcel is not adjacent to or readily accessible from a public right-of-way, a utility and access easement between the fee parcel and a public right-of-way shall also be conveyed as requested by the Utility.

G. General: A site plan must be provided indicating the following:

1. Reference to the nearest public right-of-way;

2. Adequate access;

3. Auxiliary power plug or the generator location and automatic power transfer switch;

4. The power pole location;

5. The water meter and hose bib location;

6. The landscaping the Applicant will provide;

7. Pump and pump station specifications and performance data which should include:

   a. An operators manual;

   b. Attached to the control panel, a layout block diagram showing location of different components;

   c. The performance curves for the pump submitted which must show that it will operate generally in the center part of the curve and not approach either upper or lower extreme;

   d. An electrical schematic and wiring diagram including a parts schedule containing information on type, model and rating of components; and

   e. Motor controls should include work space in the motor protection housing.

8. Emergency alarm system circuitry installed;

9. That all wiring installed is copper;

10. That all outside enclosures are NEMA 4X;

11. That a lock out/pump down switch has been provided at the wet well (This function has to be interrelated with the main auto/off/manual motor control center switch.)

12. That the electric meter faces the fence so that it can be easily read from outside the fence;

13. The fence with a 12-foot double leaf gate;

14. That the 240 volt connection provides a quick disconnect after the meter and that the 480 volt connection provides a quick disconnect before the meter;

15. The legal description of the fee parcel along with the legal description of the access and utility easement if required by the Utility;

16. The implementation of Bahia sod or rock;

17. That the parcel is above the 100-year flood elevation; and

18. Any additional requirements deemed necessary by the Utility to allow the Utility to own and operate the lift station after conveyance.

9.03 GENERAL REQUIREMENTS

A. Piping Systems:

1. Approved Pipe, Fittings and Valves: The following material or item shall be suitable for the indicated operational service:

   a. Gravity sewer influent pipe and fittings: DIP (no size limit) within 18 feet of the wet well, with interior bituminous coatings for sizes 16 inches or less and special protective interior linings for larger sizes (Other collection system materials may be used as specified in Section 7.03 of this Handbook.);

   b. Sewage pressure pipe and pittings: DIP (no size limit) within 18 feet of the discharge side of the valve vault, with interior bituminous coating for sizes 16 inches or less and special protective interior lining for larger sizes (Other force main materials may be used as specified in Section 8.03 of this Handbook.);

   c. Sewage service valves: Gate valves (solid wedge), with non-rising stem and operating nuts for underground service or rising stem and handwheels for exposed units; or, plug valves with operators for underground or exposed service; and check valves; and

d. Potable or non-potable water: Polyvinyl chloride pipe and fittings, with appropriate gate valves.

2. Connections at Structures: Where DIP extends into or through structures from the exterior, flexible connections (mechanical or push-on type joints) shall be provided at the exterior wall face.

3. Wall Pipes or Sleeves: For pipes passing through structural walls, wall pipes shall be installed where the location is below the surface of the ground or at any point where water levels will exceed the installed pipe elevation. Sleeves with watertight caulking shall be suitable at other locations.

4. Piping Flexibility: In order to provide for expansion and contraction or expedite installation and maintenance, flexible connections (flanged coupling adapters, expansion joints, couplings, etc.) shall be provided.

B. Pressure Gauges: Gauges shall be provided on each sewage pump discharge pipe, as well as other locations where pressure sensing is desirable. The gauges shall read in pounds per square inch and/or feet of water, with a range suitable for the required service, and shall be 4½-inch dial, stainless steel case, "Duragauge," as manufactured by Ashcroft, or approved equivalent. Where the pressure source is sewage, gauges shall be equipped with diaphragms (neoprene or stainless steel), or other separating device, to preclude sewage from entering the mechanism.

C. Emergency Pump Connections: For sewage pumping stations not equipped with stationary stand-by power generators, connections shall be provided for emergency auxiliary pumping. Said connection shall be located immediately outside of the pump chamber in the valve box, within range of the auxiliary pump discharge connection, and shall be coupled to the discharge main through a fitting, with valving as required for making a dead hook-up. The connection pipe shall be DIP of suitable size, but in no case less than 4 inches in diameter.

D. Surge Control: Surge control valves, or other approved systems shall be provided for all sewage pumping stations where hydraulic conditions indicate the necessity.

E. Sewage Pumps and Motors:

1. General: Sewage pumping units shall be capable of handling raw, unscreened sewage and shall be capable of passing a sphere of at least three (3) inches in diameter. Pumps shall be electric motor driven and of a proven design that has been used in the industry for sewage service under similar conditions for at least five years. Pumps shall provide the required peak design performance requirements and be suitable for operation within the total hydraulic range of operation.

2. Submersible Pumps: The pump design shall provide easy removal and replacement for inspection or maintenance purposes, without bolts or other fastenings to be removed. The units shall be non-clog, mechanical seal,

submersible sewage pumps, as manufactured by Flygt Corporation, Norwalk, Connecticut, or approved equivalent.

3. Pump Motors: All pump motors shall be designed with a 1.15 service factor and shall not be less than five (5) horsepower unless approved. Two or more normally closed heat sensing miniature switches connected in series and embedded within the motor windings shall be provided to shut off power and initiate alarm light for motor over-temperature condition. Submersible pump motors shall be capable of continuous operation under submerged as well as dry conditions without damage.

F. Pump Controls: Each pumping station control system shall include a liquid level controller which shall sense the sewage level in the wet well and provide appropriate signals to the logic circuits to produce the required mode of operation for the pumping facilities. Capability shall be provided for manual start-stop control for all pumping units, as well as the normal automatic control from the liquid level sensing and logic circuits. An automatic alternator shall change the starting sequence on each pump cycle. High and low water level alarm system shall be provided. Each sewage pump shall be provided with an elapsed time meter to indicate pump running time. In addition to the electrical requirements set forth, the submersible station controls shall be housed within an exterior panel, pole mounted or free standing enclosure. The panel will be of NEMA 4X weathertight construction, with double dead front outer doors fitted with hoop and padlock. The panel will include a battery backup to activate alarms in the event there is loss of electricity. A reverse phase monitor shall also be provided.

9.04 TYPE OF PUMPING STATION CONSTRUCTION

Sewage pumping stations of the submersible type are suitable where the peak design flow rate does not exceed 2,000 GPM or the pump motor size is 50 horsepower or less. Said installation shall include removable pump units, aluminum access frame and cover, stainless steel pipe pump guide bars, pump discharge connection and other necessary appurtenances. Individual discharge pipes shall extend from each pump to an accessible drained pit, in which the control and check valves shall be installed. The submersible pumping system and accessories shall be as manufactured by Hydromatic Pumps or approved equivalent.

9.05 TELEMETRY MONITORING REQUIREMENTS

All lift stations shall be equipped with Dataflow TAC PAK TCU monitoring equipment or approved equal.

9.06 DETAILS

Pump station details and design shall be as set forth in Section 11 of this Handbook.

SECTION 10

Grease Interceptors

10.01 GENERAL

The following Section shall be utilized in the location, design, and sizing of Grease Interceptors.

10.02 DESIGN STANDARDS

A. All Grease Interceptors shall be so installed and connected that it shall be at all times easily accessible for inspection, cleaning and removal of the intercepted grease. A Grease Interceptor shall not be installed inside any part of a building.

B. Grease Interceptors shall be constructed in accordance with Chapter 64E-6.013, Florida Administrative Code and must meet the approval of the County.

1. Grease Interceptors that are located within a parking lot, roadway, alley or travel way or other areas that experience vehicular traffic shall have a traffic-bearing lid (H-20 loading).

2. Access manholes shall be required for all Grease Interceptors and must have a minimum diameter of twenty-four (24) inches installed over both the inlet and outlet sanitary "tees" as provided in this Handbook Sec. 11. **[Need a citation as to where in this Handbook.]** The access manhole shall be installed in such a manner that it is water and gas tight and extend to at least finished grade of the surrounding area.

3. Grease Interceptors shall have a minimum of two (2) compartments with fittings designed for grease retention.

C. In no instance shall a Grease Interceptor be installed that is less than 750 gallons and the maximum size for any single Grease Interceptor shall be 1250 gallons. Sizing of Grease Interceptors will be in accordance with the following formulas:

1. Restaurants:

(S) X **(GS)** X **(HR/12)** X **(LF)** = Effective capacity in gallons.

S = number of seats in dining area.
GS = gallons of wastewater per seat; use 25 gallons for ordinary restaurant, use 10 gallons for single service article restaurants.
HR = hours of operation.
LF = loading factor; use 2.0 for interstate highways, 1.5 for other freeways, 1.25 for recreational areas, 1.0 for main highways, and 0.75 for other roads.

2. Other facilities with commercial kitchens:

   (M) X **(GM)** X **(LF)** = Effective capacity in gallons.

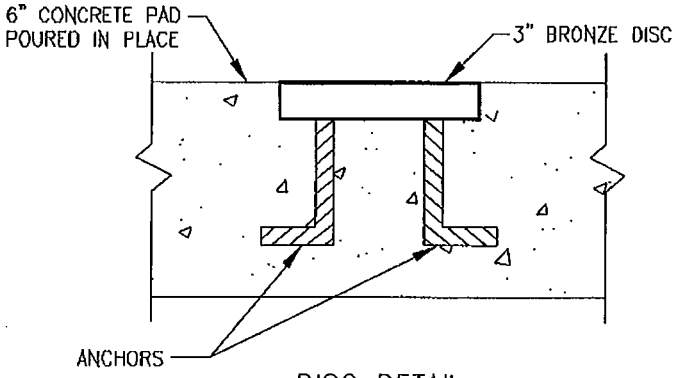
   M = meals prepared per day.
   GM = gallons of wastewater per meal; use 5 gallons.
   LF = loading factor; use 1.0 with dishwashing and 0.75 without dishwashing.

3. Commercial or industrial facilities not covered by the above, and that generate FOGs, shall be required to submit calculations, drawings, based upon the Florida Building Code Plumbing Volume, Chapter 10, sections 1003.6 through 1003.11, to the County Building Department and the Utility for review.

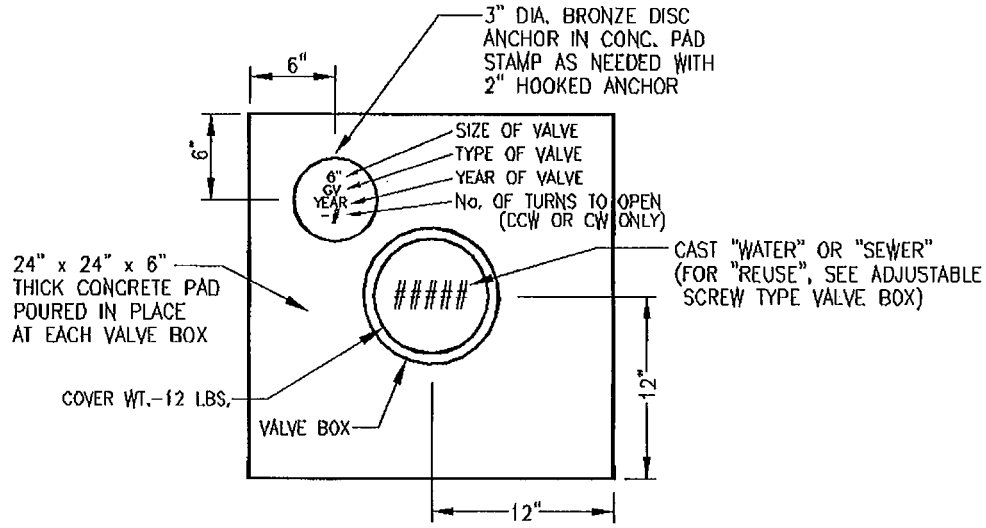
4. A sampling port shall be installed on all new Grease Interceptors. The sampling port shall be constructed downstream of the Grease Interceptor prior to the connection of the blackwater line to the wastewater collection system as provided in this Handbook Sec. 11. **[Need a citation as to where in this Handbook.]**

SECTION 11

DETAILS AND DESIGN

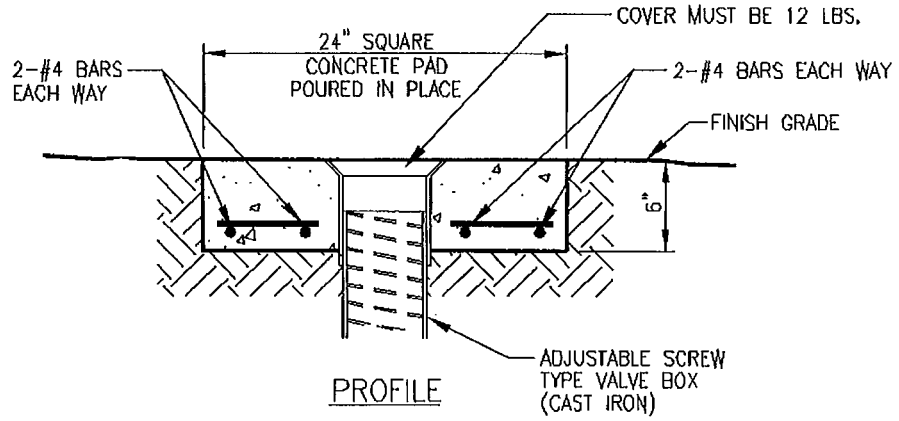


DISC DETAIL



PLAN

NOTE:
CONCRETE VALVE PADS SHALL BE USED IN UNPAVED AREAS AND SET FLUSH WITH FINAL GRADE.



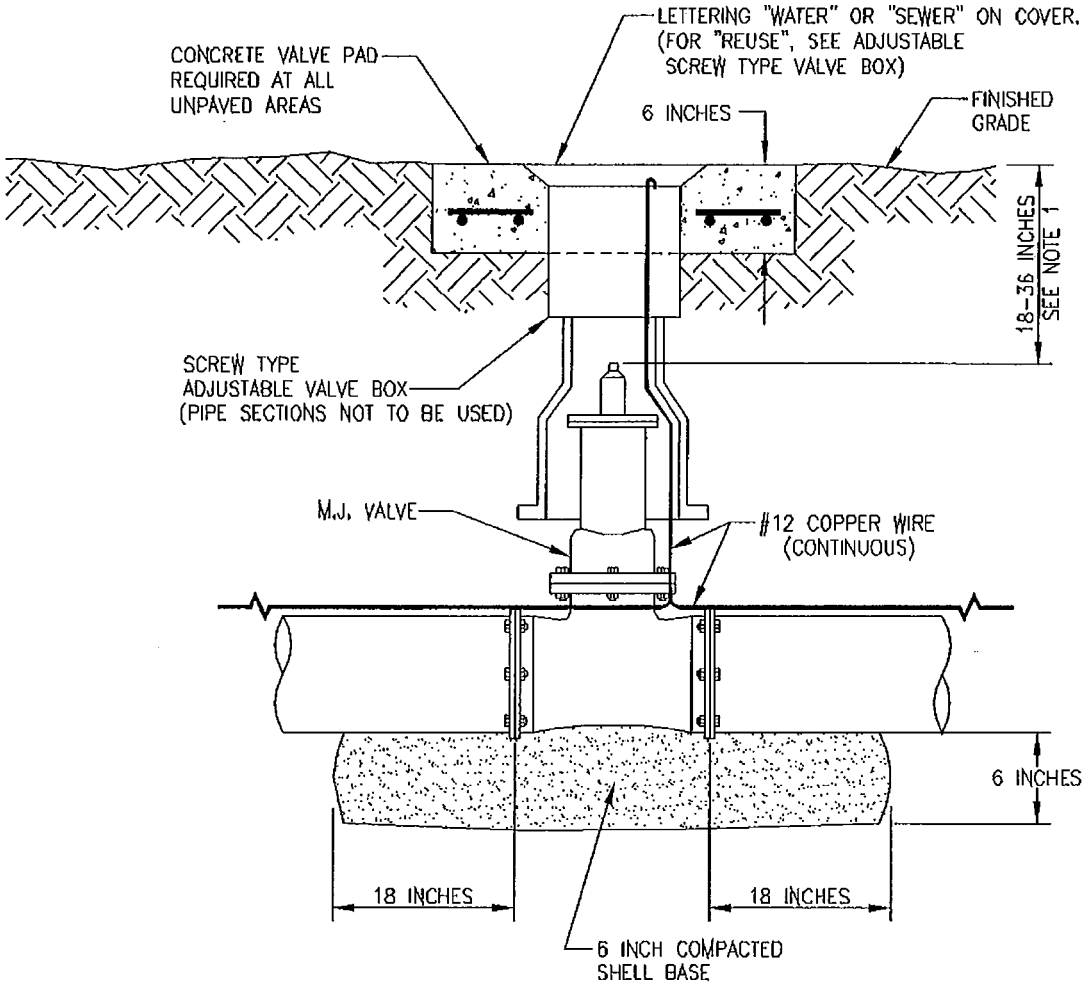
PROFILE

CONCRETE VALVE PAD

N.T.S.

CONPAD.DWG 7/22/05

DESOTO COUNTY	CONCRETE VALVE PAD N.T.S.	GEN. DWG. NO. 1



NOTES:

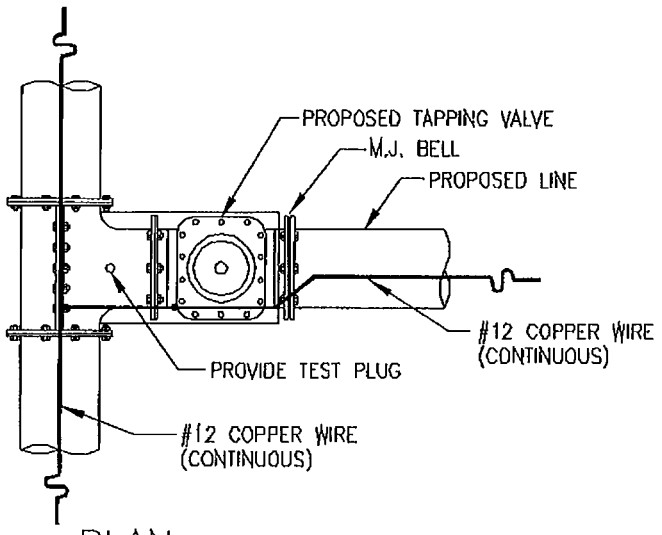
1. VALVE STEM 18-36 INCHES TO FINISHED GRADE FROM OPERATING NUT OR EXTENSION.
2. VALVE STEM EXTENSION SHALL BE SECURED WITH A STAINLESS STEEL SET SCREW TO THE OPERATING NUT, AND SUPPLIED WITH A STAINLESS STEEL CENTERING RING(S) 3 FEET ON CENTER. CENTERING RINGS SHALL BE PROVIDED AT THE TOP AND BOTTOM OF THE EXTENSION.
3. VALVE BOX RISER SHALL BE SUPPLIED BY VALVE BOX MANUFACTURER. P.V.C. RISER SHALL NOT BE ALLOWED.
4. THE 6 INCH THICK COMPACTED SHELL BASE SHALL EXTEND 18 INCHES PAST THE VALVE IN THE DIRECTION OF THE PIPE AND 12 INCHES ON EITHER SIDE OF THE VALVE.
5. PROVIDE CONCRETE VALVE PAD PER GEN. DWG. NO. 1.

TYPICAL VALVE AND VALVE BOX

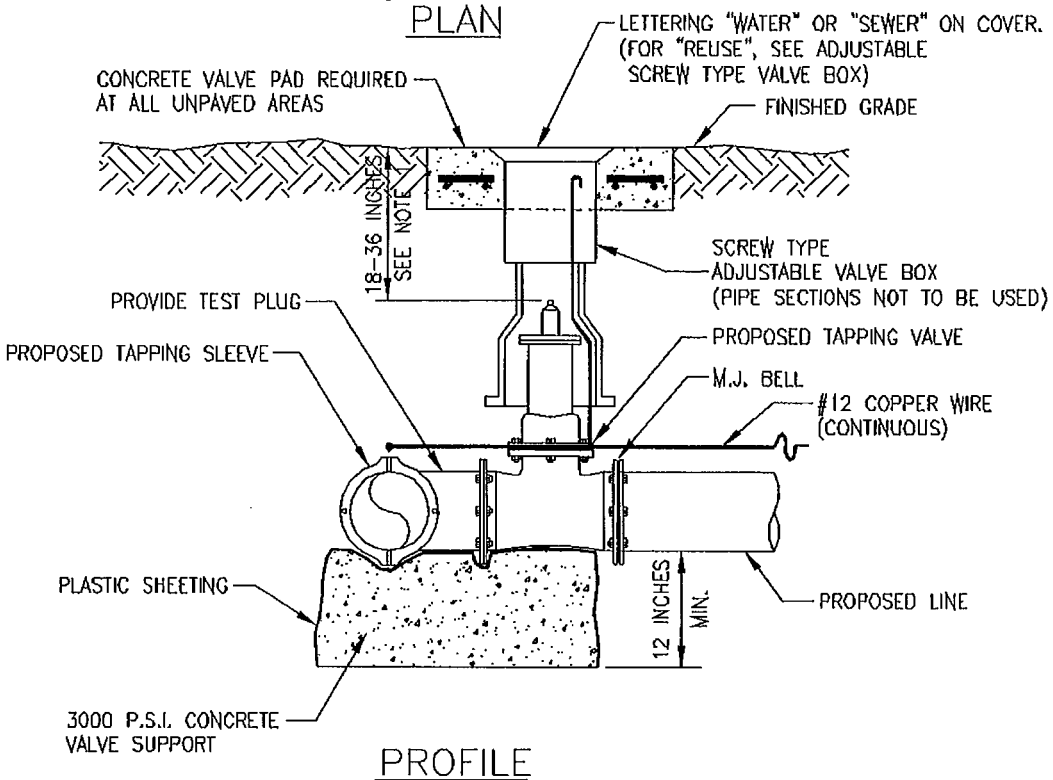
N.T.S.

VALVEBOX.DWG 07/22/05

DESOTO COUNTY	TYPICAL VALVE AND VALVE BOX N.T.S.	GEN. DWG. NO. 2



PLAN



PROFILE

NOTES:

1. VALVE STEM 18-36 INCHES TO FINISHED GRADE FROM OPERATING NUT OR EXTENSION.
2. VALVE STEM EXTENSION SHALL BE SECURED WITH A STAINLESS STEEL SET SCREW TO THE OPERATING NUT, AND SUPPLIED WITH A STAINLESS STEEL CENTERING RING(S) 3 FEET ON CENTER. CENTERING RINGS SHALL BE PROVIDED AT THE TOP AND BOTTOM OF THE EXTENSION.
3. VALVE BOX RISER SHALL BE SUPPLIED BY VALVE BOX MANUFACTURER. P.V.C. RISER SHALL NOT BE ALLOWED.
4. NO TAP SHALL BE MADE BEFORE A TEST OF 150 P.S.I. FOR 30 MINUTES IS PERFORMED ON THE VALVE AND SLEEVE ASSEMBLY WITH ZERO LOSS, WITH THE VALVE IN THE OPEN POSITION AND PLUGGED OR CAPPED.
5. PROVIDE CONCRETE VALVE PAD PER GEN. DWG. NO. 1.

TAPPING SLEEVE & VALVE

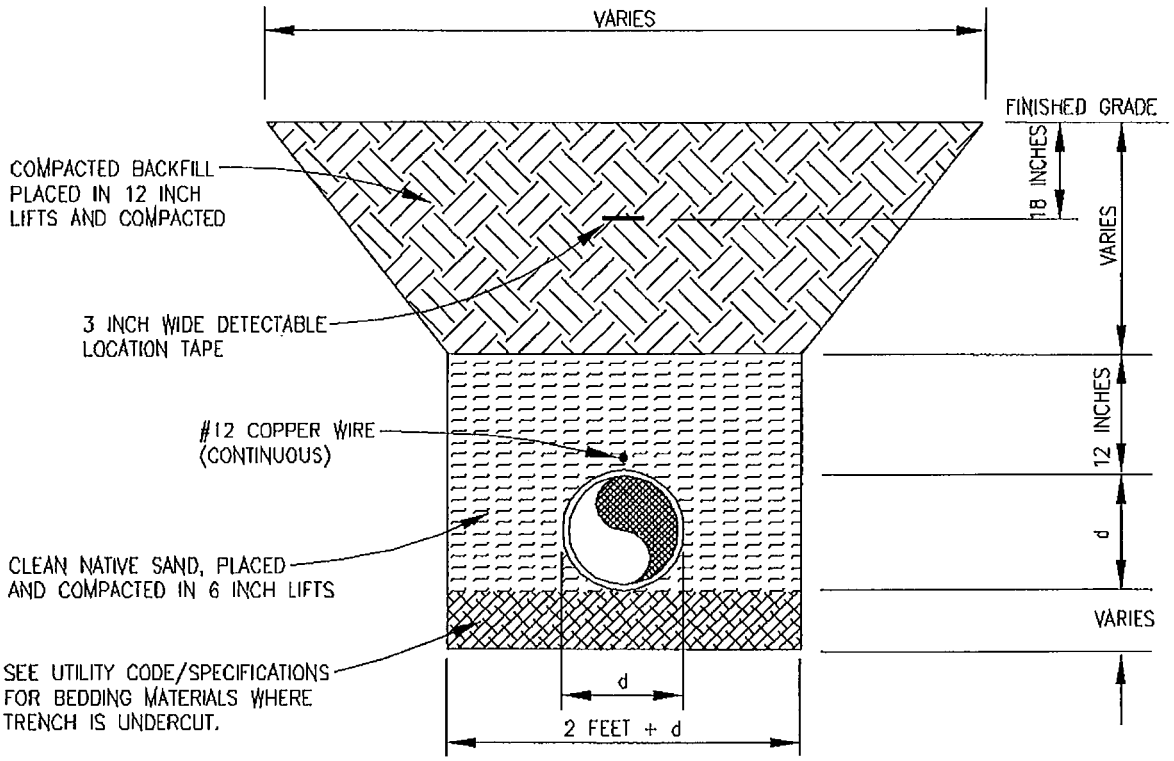
N.T.S.

DESOTO COUNTY	TAPPING SLEEVE & VALVE N.T.S.	GEN. DWG. NO. 3

VALVETAP.DWG 07/22/05

NOTES:

1. TRENCH WIDTH SHALL BE APPROX. EQUAL TO THE PIPE DIA. + 2 FEET OR AS PER AWWA AND THE MANUFACTURERS RECOMMENDATIONS.
2. PROVIDE SHEETING AND SHORING AS NECESSARY IN ACCORDANCE WITH OSHA STANDARDS.
3. BACKFILL MATERIALS SHALL BE APPROVED BY THE ENGINEER WHERE THE PIPE IS UNDERCUT.
4. WATER, SEWER, AND REUSE MAINS TO BE INSTALLED WITH A MINIMUM 36 INCHES OF COVER.
5. FOR COUNTY R/W, REFER TO LAND DEVELOPMENT REGULATIONS FOR ROADWAY REPLACEMENT, PAVEMENT OVERLAY AND DENSITY REQUIREMENTS.
6. FOR STATE R/W, REFER TO F.D.O.T. REGULATIONS FOR ROADWAY REPLACEMENT, PAVEMENT OVERLAY AND DENSITY REQUIREMENTS.

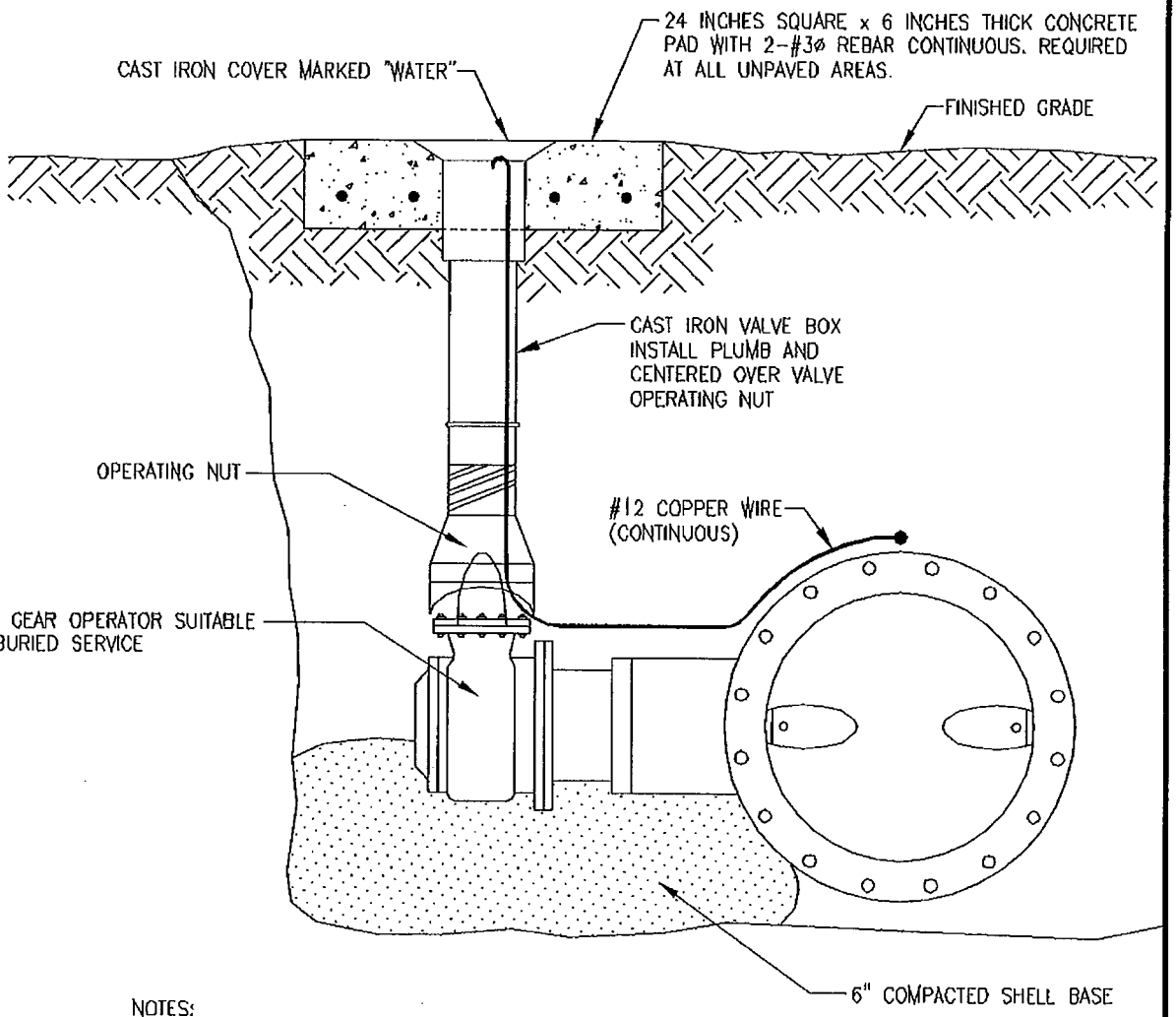


TRENCH DETAIL

N.T.S.

TRENCHF.DWG 07/22/05

DESOTO COUNTY	TRENCH DETAIL N.T.S.	GEN. DWG. NO. 4



NOTES:

1. VALVE STEM MAXIMUM DEPTH 36 INCHES TO FINISHED GRADE.
2. VALVE STEM EXTENSION SHALL BE SECURED WITH A STAINLESS STEEL SET SCREW TO THE OPERATING NUT, AND SUPPLIED WITH A STAINLESS STEEL CENTERING RING(S).
3. VALVE BOX RISER SHALL BE SUPPLIED BY VALVE BOX MANUFACTURER. P.V.C. RISER SHALL NOT BE ALLOWED.

BUTTERFLY VALVE

N.T.S.

FLYVALVE.DWG 07/22/05

DESOTO COUNTY	BUTTERFLY VALVE N.T.S.	GEN. DWG. NO. 6

JACKB.DWG 07/22/05

DESOTO COUNTY

TYPICAL JACK AND BORE CROSSING DETAIL

N.T.S.

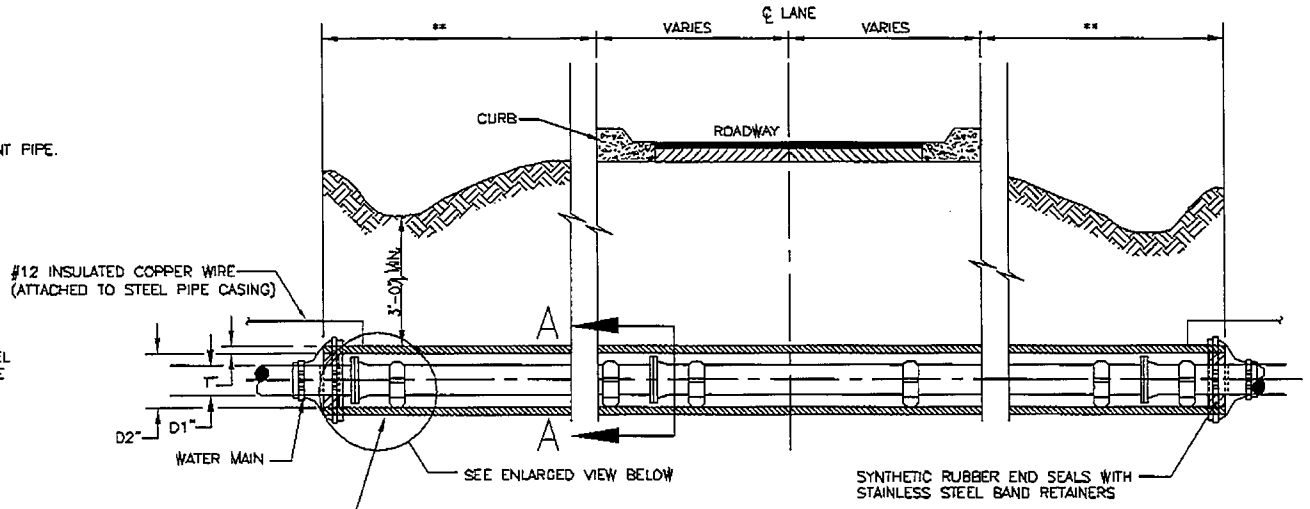
GEN. DWG. NO. 7

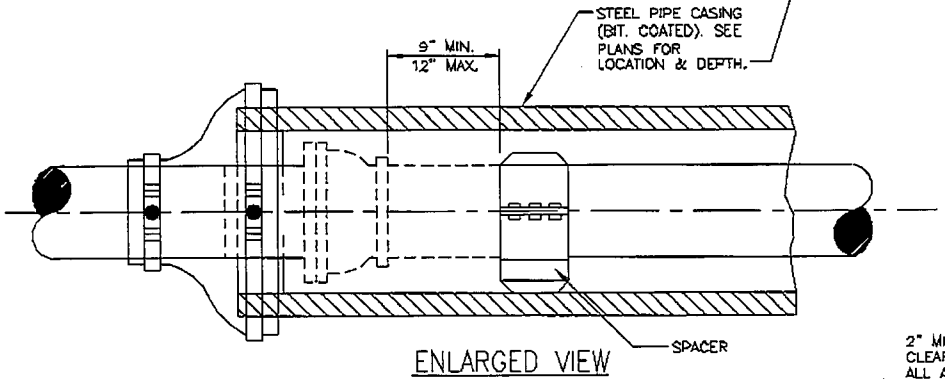
NOTES:

** WITH CURB – 5' MINIMUM STATE ROADS,
3' MINIMUM COUNTY ROADS.

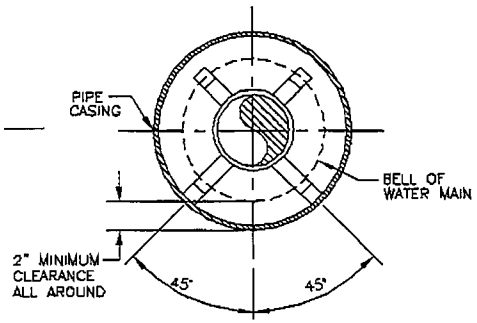
W/O CURB – 8' MINIMUM STATE ROADS,
4' MINIMUM COUNTY ROADS.

1. ALL PIPING WITHIN THE CASING SHALL BE RESTRAINED JOINT PIPE.
2. 2 PIECE STAINLESS STEEL SPACERS 12" LONG WITH 2" WIDE PLASTIC RUNNERS.
3. CONTRACTOR TO INSTALL SPACERS AND SEALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, MINIMUM 3 SPACERS PER PIPE SECTION.
4. ENDS OF CASING PIPE SHALL BE A CIRCUMFERENTIAL RIB MOLDED SEAL MADE OF FLEXIBLE SYNTHETIC 3/16 INCH THICK RUBBER SIZED TO FIT CASING AND CARRIER PIPE. THE END SHALL BE SECURED WITH T-304 STAINLESS STEEL BANDING STRAPS WITH WORM GEAR MECHANISM TO ENSURE A WATER TIGHT SEAL. THE END SEAL SHALL BE THE STANDARD PULL-ON (MODEL S) MANUFACTURED BY PSI, OR APPROVED EQUAL AS SPECIFIED ON THE DRAWING.

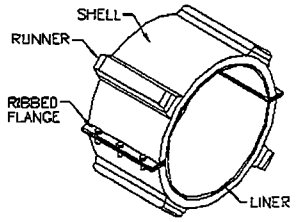




ENLARGED VIEW



SECTION A-A

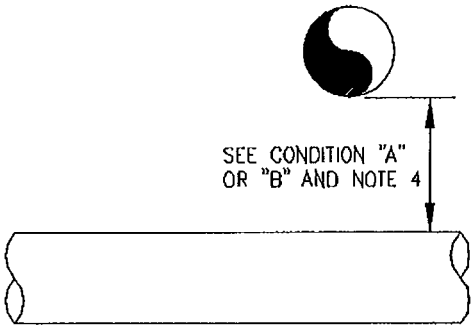


SPACER

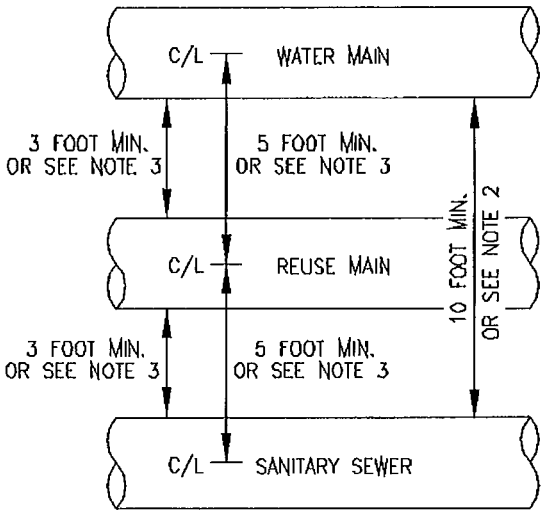
TYPICAL JACK AND BORE CROSSING DETAIL

N.T.S.

VERTICAL



HORIZONTAL



CONDITION "A"; WATER MAIN CROSSING OVER REUSE MAIN/SEWER MAIN

MINIMUM VERTICAL SEPARATION SHALL BE 18 INCHES OR BOTH MAINS MUST BE DUCTILE IRON PIPE OR SDR-14 C-900 P.V.C. FOR A MINIMUM CONTINUOUS LENGTH OF 18 FEET CENTERED AT THE WATER MAIN.

CONDITION "B"; WATER MAIN CROSSING UNDER REUSE MAIN/SEWER MAIN

IF THERE IS LESS THAN 18 INCHES OF CLEARANCE BETWEEN THE SEWER MAIN AND EITHER A WATER MAIN OR REUSE MAIN, BOTH MAINS MUST BE SDR-14. IF THERE IS GREATER THAN 18 INCHES OF CLEARANCE, THE SEWER MAIN CAN BE SDR-25.

SEWER MAIN MUST BE A MINIMUM CONTINUOUS LENGTH OF 18 FEET CENTERED AT THE WATER MAIN REGARDLESS OF VERTICAL CLEARANCE.

NOTES:

1. WHEN BOTH MAINS ARE EITHER DUCTILE IRON PIPE OR SDR-14 C-900 P.V.C., THE MINIMUM VERTICAL CLEARANCE MAY BE 6 INCHES.
2. IF A 10 FOOT MINIMUM HORIZONTAL SEPARATION CAN NOT BE OBTAINED BETWEEN WATER AND SEWER MAINS, BOTH PIPES SHALL BE DUCTILE IRON PIPE OR SDR-14 C-900 P.V.C. UNTIL A 10 FOOT CLEARANCE IS OBTAINED.
3. IF 5 FOOT MINIMUM (CENTER TO CENTER) OR 3 FOOT MINIMUM (OUTSIDE TO OUTSIDE) SEPARATION CAN NOT BE OBTAINED BETWEEN REUSE MAIN AND WATER OR SEWER MAIN, ALL PIPE SHALL BE DUCTILE IRON PIPE OR SDR-14 C-900 P.V.C. UNTIL THE 5 FOOT OR 3 FOOT SEPARATION IS OBTAINED.
4. CONCRETE ENCASEMENT SHALL NOT BE ACCEPTED.

CROSSING.DWG 07/22/05

WATER AND SEWER MAIN CROSSINGS

N.T.S.

DESOTO COUNTY	WATER & SEWER MAIN CROSSINGS N.T.S.	GEN. DWG. NO. 8

FDOTARV1.DWG 07/22/05

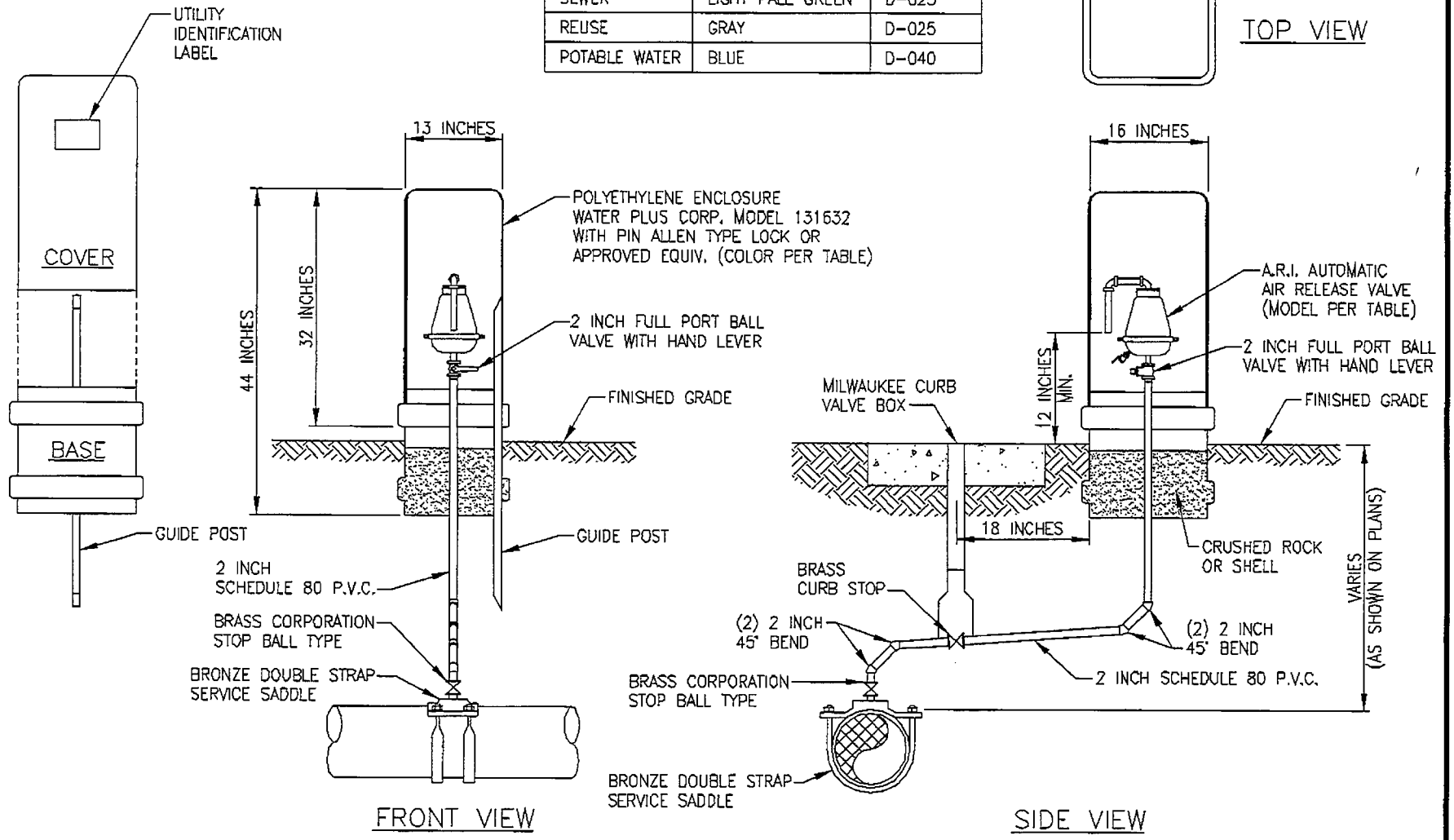
DESOTO COUNTY

AUTOMATIC AIR RELEASE VALVE

N.T.S.

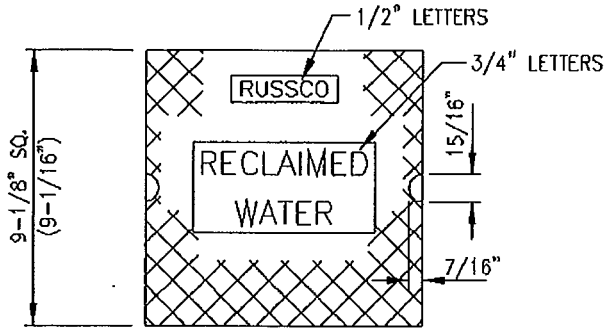
GEN. DWG. NO. 9

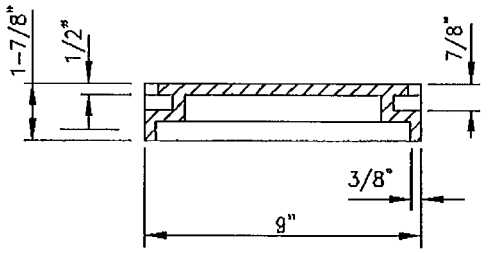
TYPE OF USE	ENCLOSURE COLOR CODE	A.R.I. MODEL NO.
SEWER	LIGHT PALE GREEN	D-025
REUSE	GRAY	D-025
POTABLE WATER	BLUE	D-040



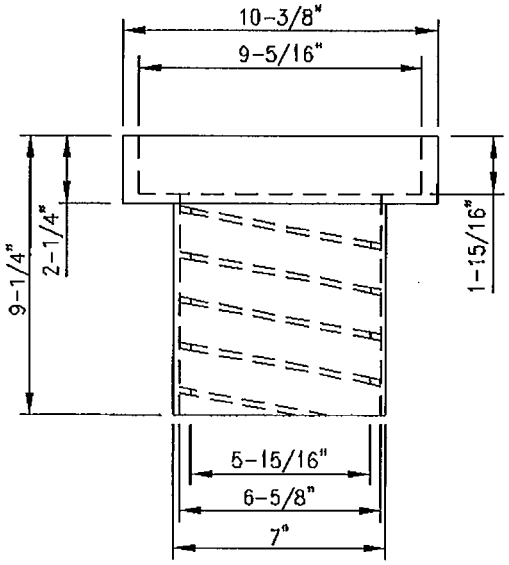
AUTOMATIC AIR RELEASE VALVE

N.T.S.

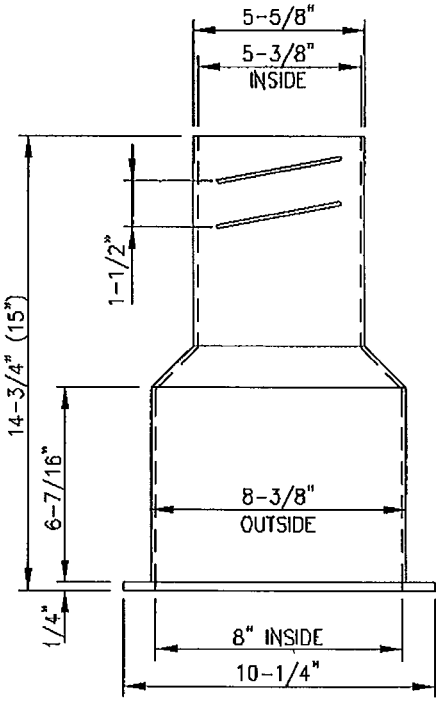




LID
WT.- 13 LBS.



TOP
WT.- 27 LBS.



BOTTOM
WT.- 20 LBS.

NOTES:

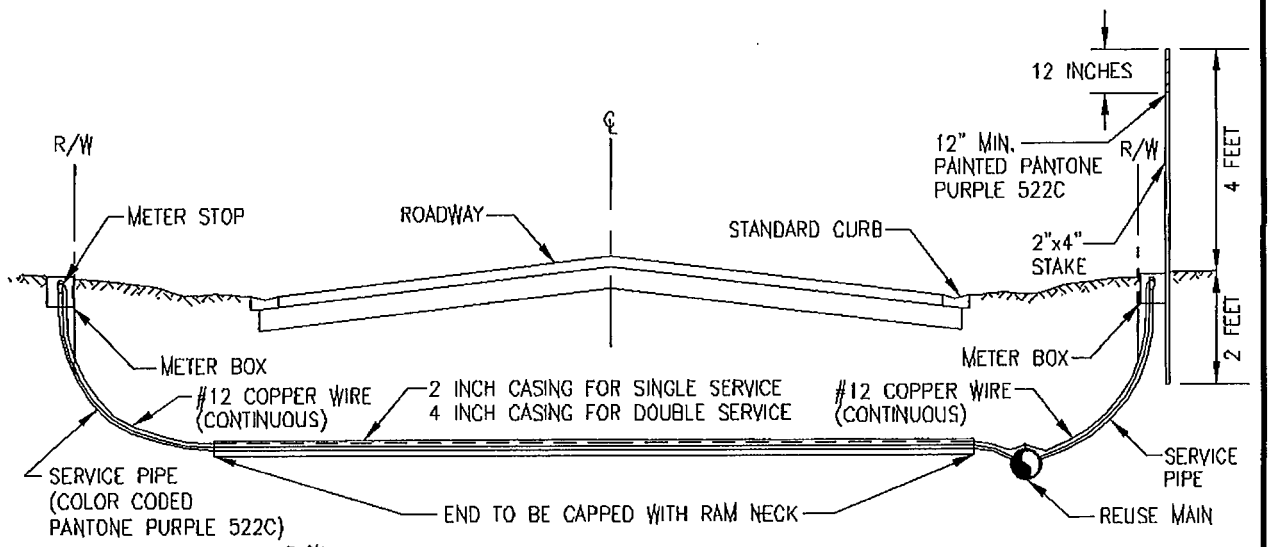
1. MATERIAL TO BE CAST IRON.
2. ALL ITEMS TO HAVE A BITUMASTIC ASPHALTIC TAR COATING.
3. ADJUSTABLE SCREW TYPE VALVE BOX PER SIGMA CORPORATION DRAWING RVB-2503 OR APPROVED EQUIV.

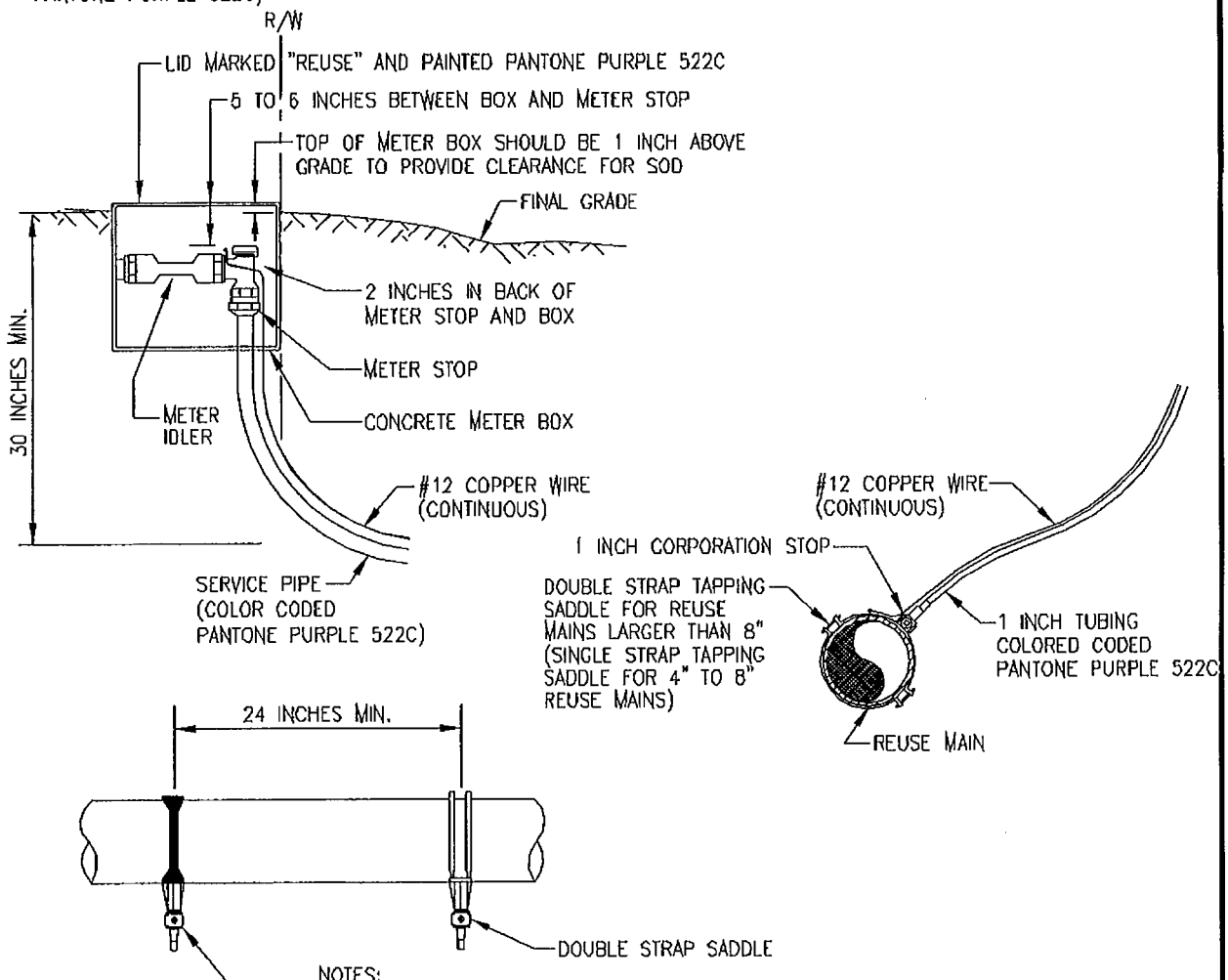
ADJUSTABLE SCREW TYPE VALVE BOX

N.T.S.

DESOTO COUNTY	ADJUSTABLE SCREW TYPE VALVE BOX N.T.S.	REUSE DWG. NO. 1

ADJVALBX.DWG 07/22/05





NOTES:
1. #12 COPPER WIRE SHALL BE INSTALLED WITH EACH SERVICE.
2. METER IDLER FOR SINGLE FAMILY RESIDENCES ONLY.

TYPICAL REUSE SERVICE CONNECTION

2" DIAMETER AND SMALLER

N.T.S.

DESOTO COUNTY	TYPICAL REUSE SERVICE CONNECTION N.T.S.	REUSE DWG. NO. 2

RESERVE.DWG 07/22/05

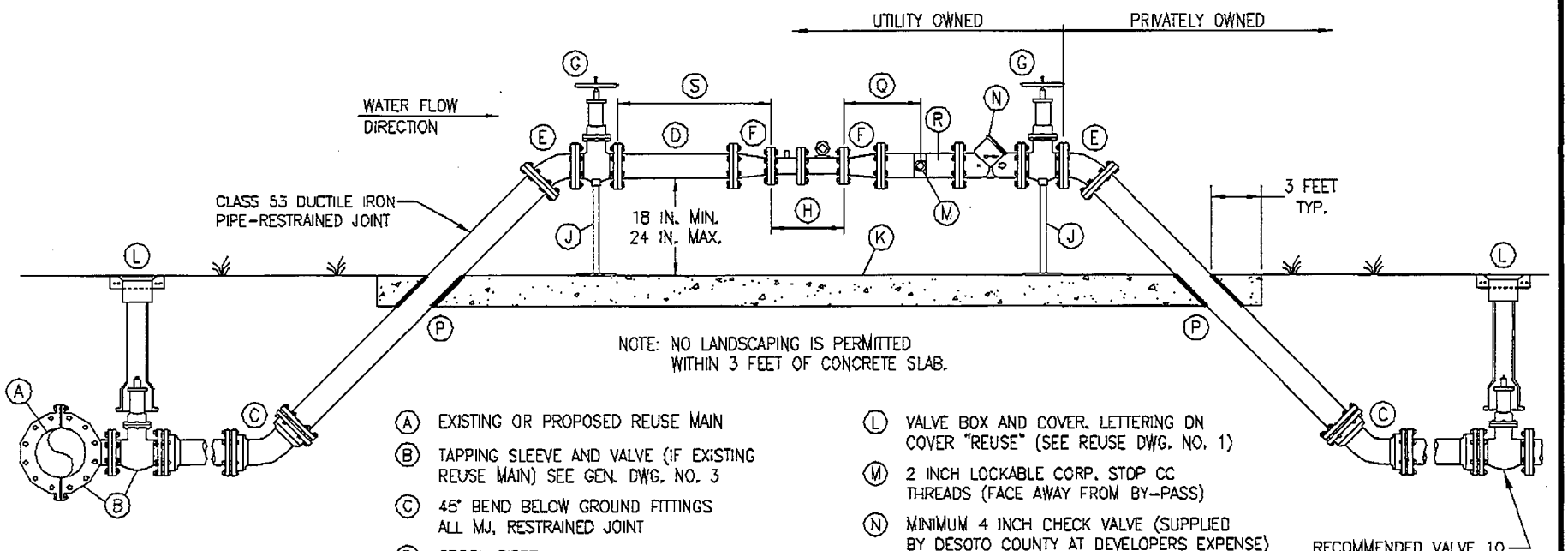
REMETER.DWG 07/22/05

DESOTO COUNTY

REUSE WATER METER ASSEMBLY

N.T.S.

REUSE DWG. NO. 3



FLOW RANGE (GPM)	METER SIZE (INCH)
100-250	3
125-500	4
220-1200	6
250-1500	8

(A) EXISTING OR PROPOSED REUSE MAIN

(B) TAPPING SLEEVE AND VALVE (IF EXISTING REUSE MAIN) SEE GEN. DWG. NO. 3

(C) 45° BEND BELOW GROUND FITTINGS ALL MJ. RESTRAINED JOINT

(D) SPOOL PIECE

(E) 45° BEND ABOVE GROUND FITTINGS ALL FLANGED

(F) FLANGED REDUCER ONE PIPE DIA. ONLY WHEN NECESSARY

(G) OS & Y GATE VALVES (FLANGED) MINIMUM 4 INCHES

(H) STRAINER AND METER (SUPPLIED BY DESOTO COUNTY AT DEVELOPERS EXPENSE)

(J) MINIMUM (2) ADJUSTABLE STAINLESS STEEL PIPE SUPPORTS SECURED TO CONCRETE PAD

(K) CONCRETE PAD TO BE A MINIMUM OF 6 FEET WIDE AND 4 INCHES THICK WITH W.W.M. REINFORCEMENT

(L) VALVE BOX AND COVER. LETTERING ON COVER "REUSE" (SEE REUSE DWG. NO. 1)

(M) 2 INCH LOCKABLE CORP. STOP CC THREADS (FACE AWAY FROM BY-PASS)

(N) MINIMUM 4 INCH CHECK VALVE (SUPPLIED BY DESOTO COUNTY AT DEVELOPERS EXPENSE)

(P) 1/2 INCH THICK NEOPRENE SLEEVE BETWEEN PIPE AND CONCRETE PAD

(Q) TEST TAP PLACEMENT DISTANCE FROM DOWN STREAM METER FLANGE EXCEPT WHEN USING FLANGED REDUCER START AT DOWNSTREAM END OF FLANGED REDUCER (SEE BELOW)

(R) DISTANCE FROM TEST TAP TO DOWNSTREAM FLANGE 2 PIPE DIAMETER MINIMUM

(S) METER PLACEMENT DISTANCE FROM DOWN STREAM FLANGE OF GATE VALVE TO UPSTREAM STRAINER/METER FLANGE (SEE BELOW)

PAINT COLOR - PANTONE PURPLE 522C

NO 3 INCH PIPING OR VALVES

(S) METER PLACEMENT
4 INCH ASSEMBLY SIZE = 40 INCH
6 INCH ASSEMBLY SIZE = 60 INCH
8 INCH ASSEMBLY SIZE = 80 INCH

NOTE: ALL DIMENSIONS BASED ON ASSEMBLY PIPING SIZE, NOT METER SIZE. METERS MAY BE DOWN SIZED ONE PIPE SIZE ONLY.

(Q) TEST TAP PLACEMENT
4 INCH ASSEMBLY SIZE = 12 INCH
6 INCH ASSEMBLY SIZE = 18 INCH
8 INCH ASSEMBLY SIZE = 24 INCH

REUSE WATER METER ASSEMBLY

METERS 3" DIAMETER AND LARGER

N.T.S.

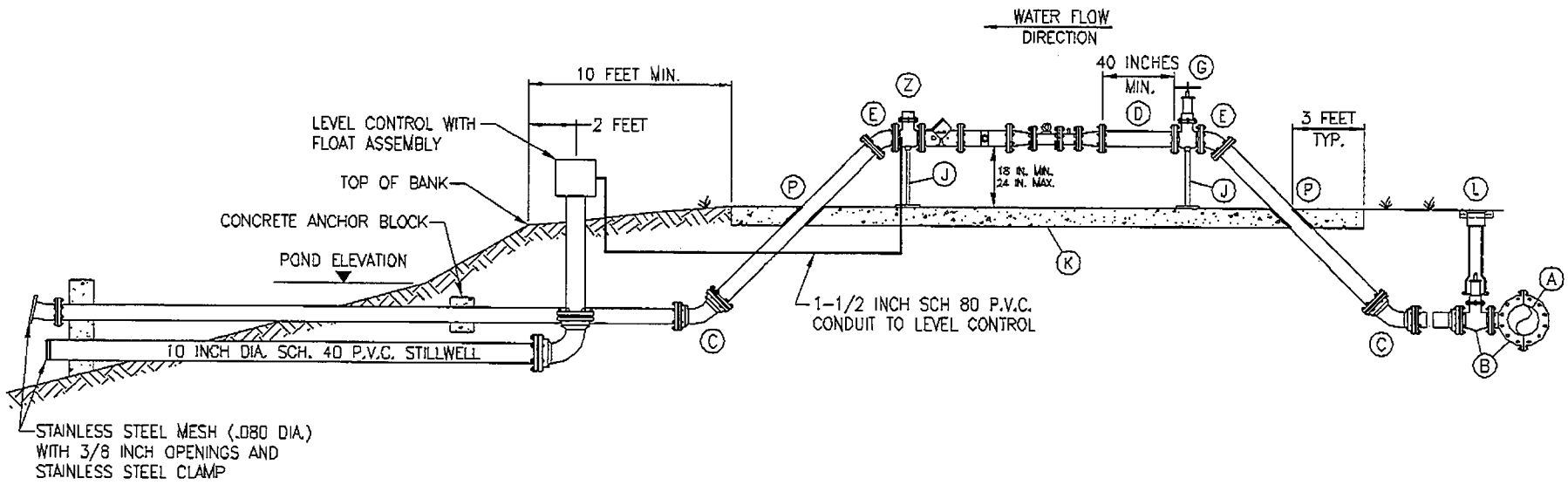
REFLCONT.DWG 07/22/05

DESOTO COUNTY

REUSE CONTROL VALVE ASSEMBLY

N.T.S.

REUSE DWG. NO. 4



(A) EXISTING OR PROPOSED REUSE MAIN

(B) TAPPING SLEEVE AND VALVE (IF EXISTING REUSE MAIN) SEE GEN. DWG. NO. 3

(C) 45° BEND BELOW GROUND FITTINGS ALL MJ. RESTRAINED JOINT

(D) SPOOL PIECE

(E) 45° BEND ABOVE GROUND FITTINGS ALL FLANGED

(F) FLANGED REDUCER ONE PIPE DIA. ONLY WHEN NECESSARY

(G) OS & Y GATE VALVES (FLANGED) MINIMUM 4 INCHES

(H) STRAINER AND METER (SUPPLIED BY DESOTO COUNTY AT DEVELOPERS EXPENSE)

(J) MINIMUM (2) ADJUSTABLE STAINLESS STEEL PIPE SUPPORTS SECURED TO CONCRETE PAD

(K) CONCRETE PAD TO BE A MINIMUM OF 6 FEET WIDE AND 4 INCHES THICK WITH W.W.M. REINFORCEMENT

(L) VALVE BOX AND COVER. LETTERING ON COVER "REUSE" (SEE REUSE DWG. NO. 1)

(M) 2 INCH LOCKABLE CORP. STOP CC THREADS (FACE AWAY FROM BY-PASS)

(N) MINIMUM 4 INCH CHECK VALVE (SUPPLIED BY DESOTO COUNTY AT DEVELOPERS EXPENSE)

(P) 1/2 INCH THICK NEOPRENE SLEEVE BETWEEN PIPE AND CONCRETE PAD

(Q) TEST TAP PLACEMENT DISTANCE FROM DOWN STREAM METER FLANGE EXCEPT WHEN USING FLANGED REDUCER START AT DOWNSTREAM END OF FLANGED REDUCER (SEE BELOW)

(R) DISTANCE FROM TEST TAP TO DOWNSTREAM FLANGE 2 PIPE DIAMETER MINIMUM

(S) METER PLACEMENT DISTANCE FROM DOWN STREAM FLANGE OF GATE VALVE TO UPSTREAM STRAINER/METER FLANGE (SEE BELOW)

PAINT COLOR - PANTONE PURPLE 522C

NO 3 INCH PIPING OR VALVES

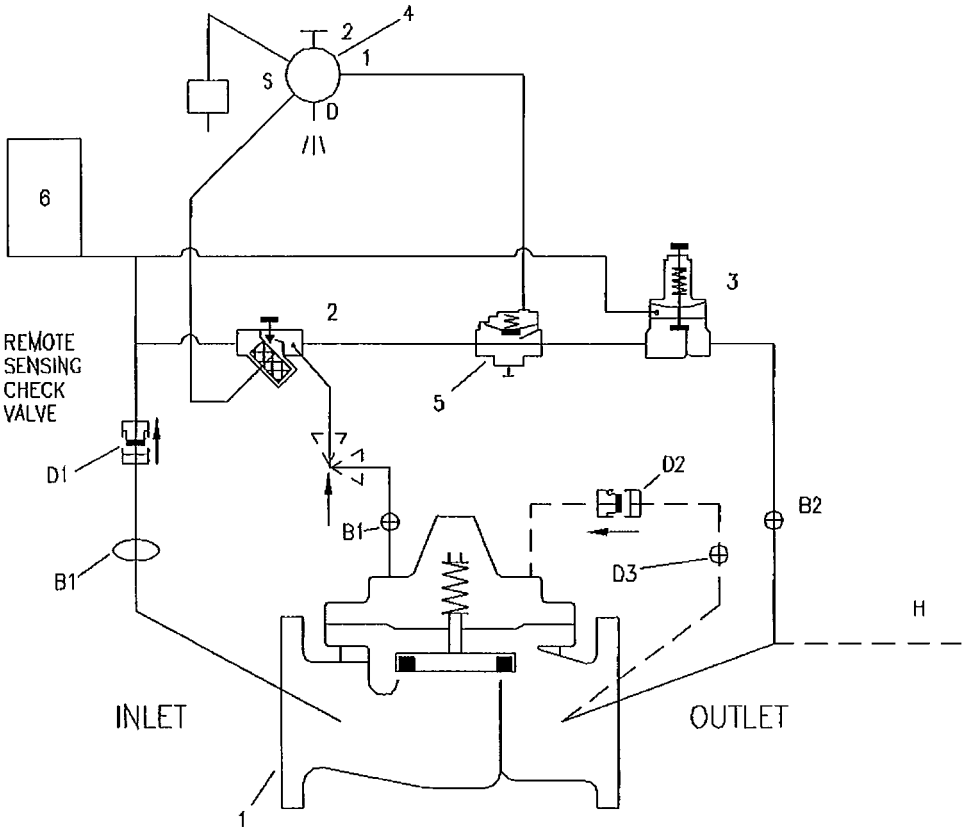
NOTE: ALL DIMENSIONS BASED ON ASSEMBLY PIPING SIZE, NOT METER SIZE. METERS MAY BE DOWN SIZED ONE PIPE SIZE ONLY.

REUSE CONTROL VALVE ASSEMBLY

METERS 3" DIAMETER AND LARGER

N.T.S.

ITEM NO.	BASIC COMPONENTS
1	100-20 HYTROL (624-14) MAIN VALVE
2	X42N-3 STRAINER NEEDLE VALVE
3	CRL PRESSURE RELIEF CONTROL
4	CF1-C1 FLOAT CONTROL
5	100-01 HYTROL (REVERSE FLOW)
6	HYDRO-PNEUMATIC TANK - WELL-X-TROL WX-201 LTD OR EQUAL



ITEM NO.	OPTIONAL FEATURE SUFFIX
B	CK2 COCK (ISOLATION VALVE)
D	CHECK VALVES WITH COCK
F	REMOTE PILOT SENSING
H	DRAIN TO ATMOSPHERE
S	CV FLOW CONTROL (OPENING)
KC	12 MIL EPOXY LINING

FLOAT VALVE DETAIL

N.T.S.

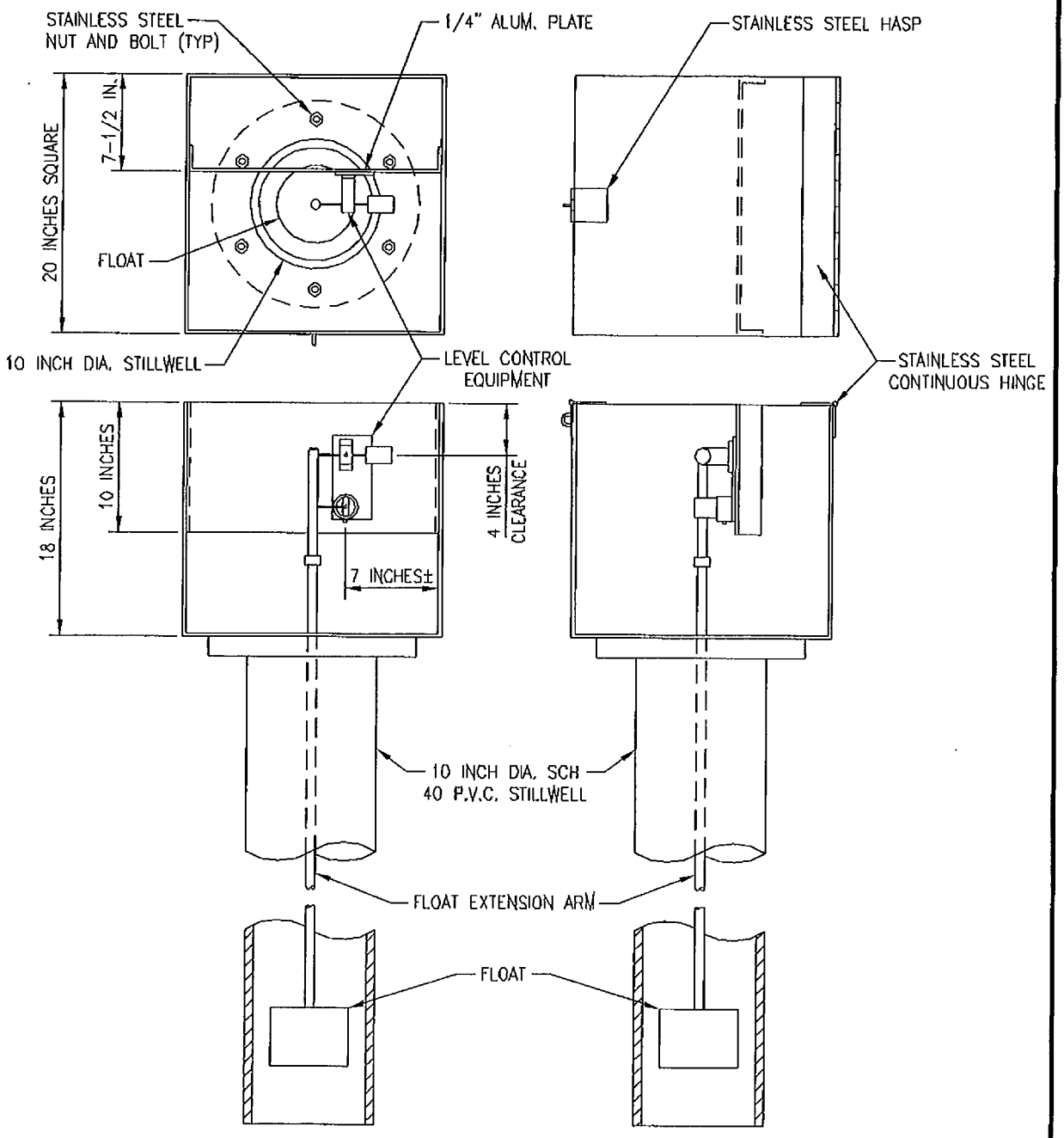
REFLTVLV.DWG 07/22/05

DESOTO COUNTY	FLOAT VALVE DETAIL N.T.S.	REUSE DWG. NO. 5

NOTES:

1. EQUIPMENT ENCLOSURE MATERIAL TO BE 1/4 INCH ALUMINUM WITH CONTINUOUS SEAM WELDS.
2. ALL HARDWARE TO BE STAINLESS STEEL.
3. LEVEL CONTROL EQUIPMENT TO BE MOUNTED TO MAINTAIN FLOAT CENTERED IN STILLWELL.

TOP VIEW



SECTION

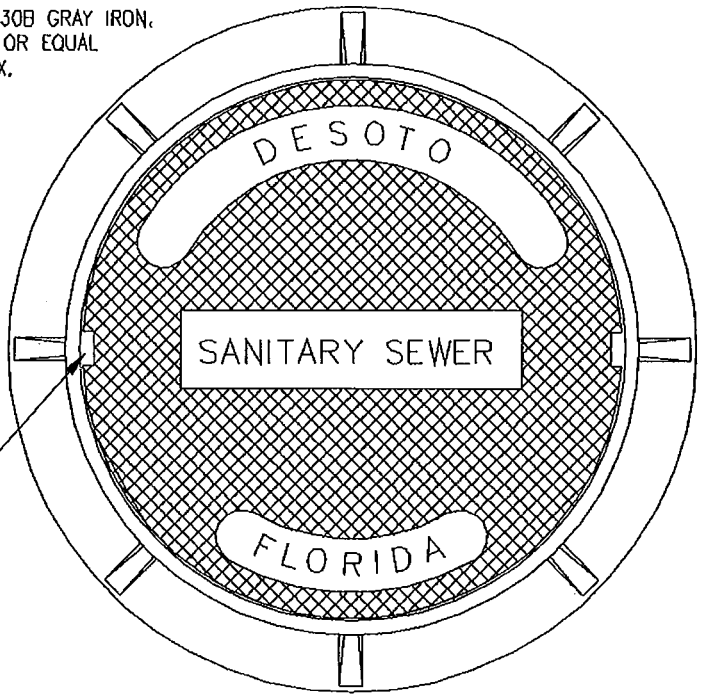
LEVEL CONTROL AND FLOAT ASSY DETAIL

N.T.S.

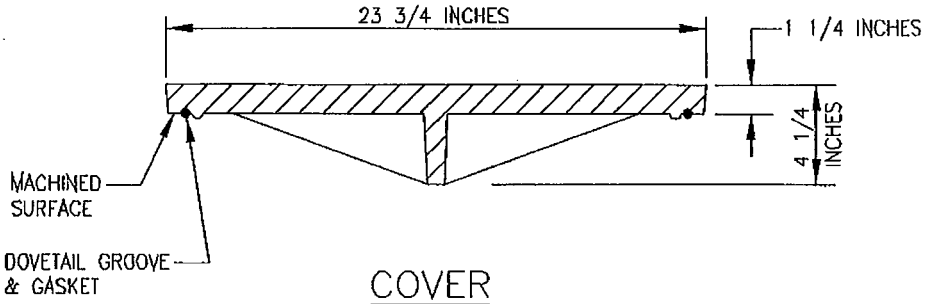
RELVLFLT.DWG 07/22/05

DESOTO COUNTY	LEVEL CONTROL AND FLOAT ASSY DETAIL N.T.S.	REUSE DWG. NO. 6

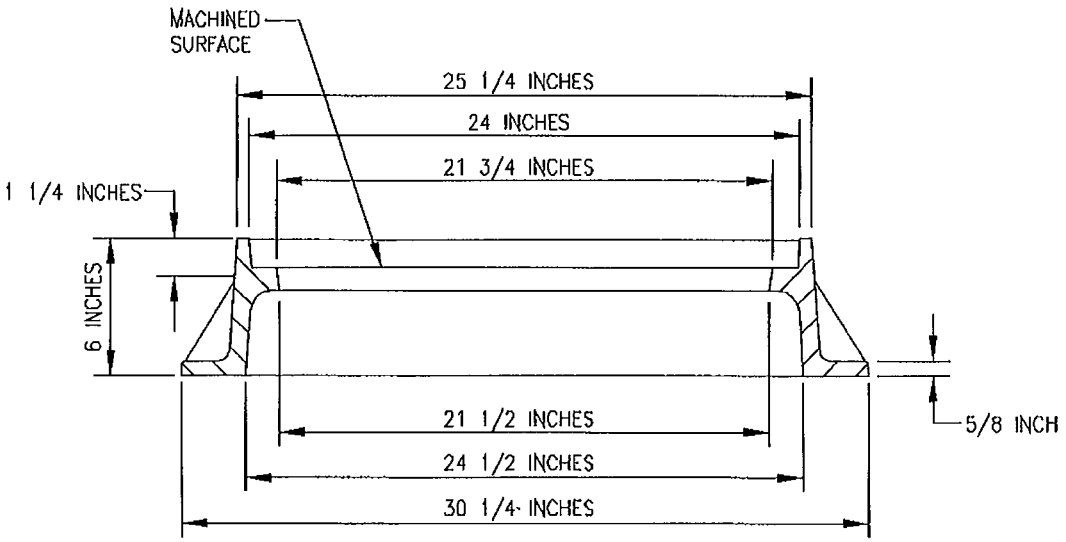
NOTES:
1. MATERIAL: ASTM-A48 CLASS 30B GRAY IRON.
2. U.S. FOUNDRY 170-CE ORS OR EQUAL
3. COVER WT. 150 LBS. APPROX.
4. RING WT. 155 LBS. APPROX.



2-NON PENETRATING PICKHOLES



COVER



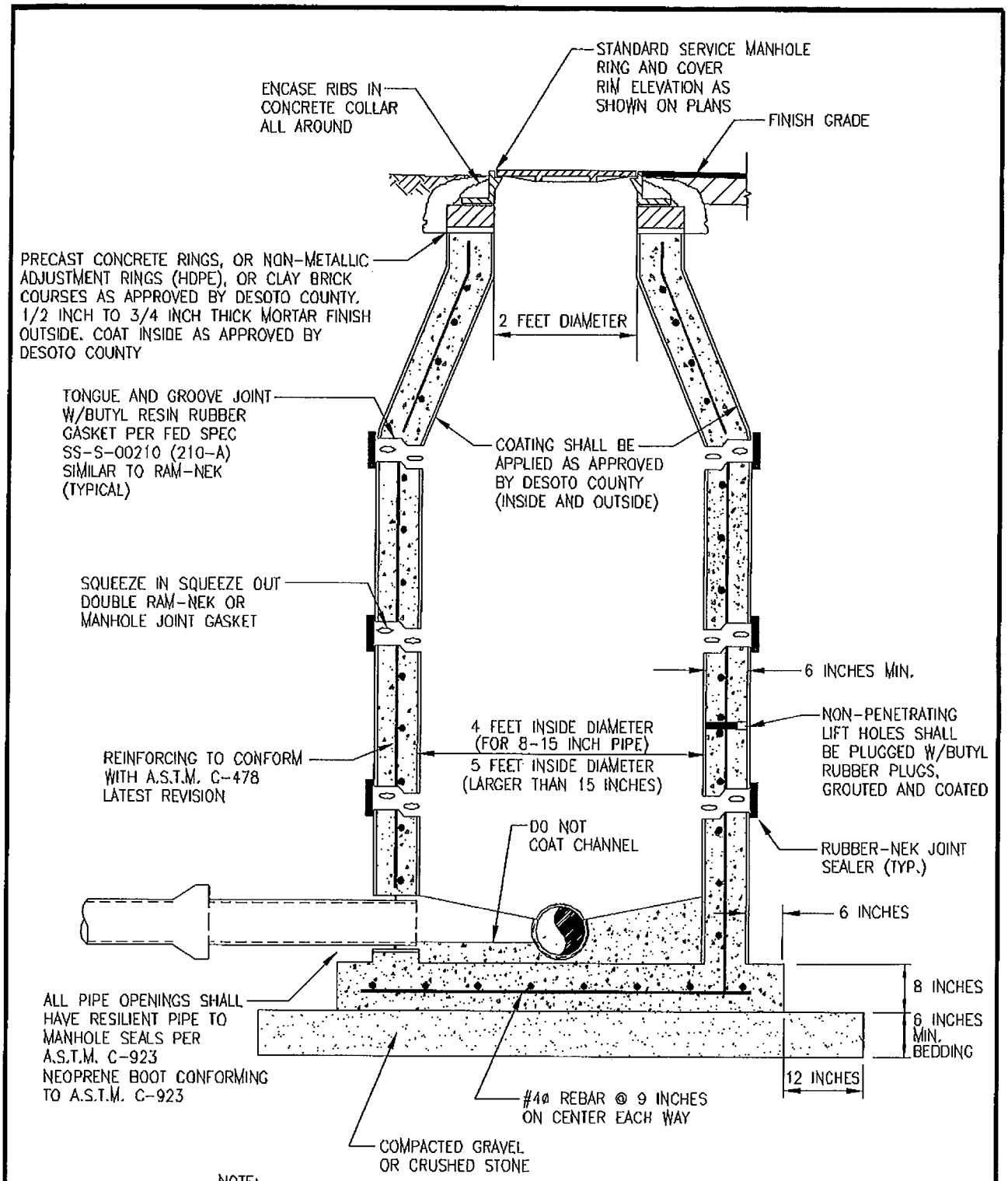
FRAME

STANDARD MANHOLE RING AND COVER

N.T.S.

DESOTO COUNTY	STANDARD MANHOLE RING AND COVER N.T.S.	SEWER DWG. NO. 1

MHCOVER1.DWG 07/22/05



NOTE:

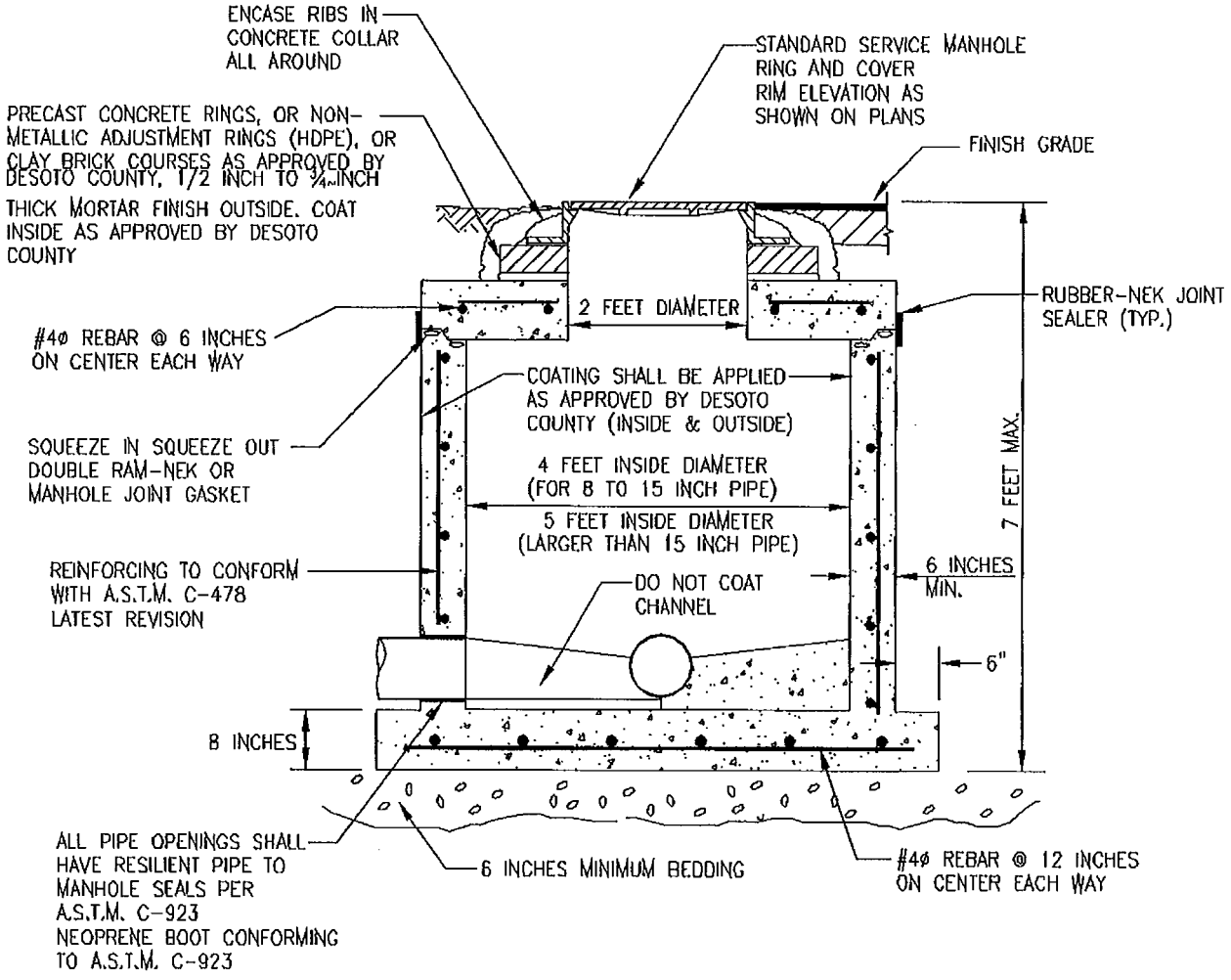
1. MANHOLE SHALL CONFORM TO A.S.T.M. C-478 LATEST REVISION TYPE II CONCRETE, 4000 P.S.I. 28 DAY COMPRESSIVE STRENGTH
2. INTERCEPTOR MANHOLES, DROP MANHOLES, AND MANHOLES WITH INTERCEPTING FORCE MAINS SHALL BE LINED AS APPROVED BY DESOTO COUNTY
3. LIFTING HOLES SHALL BE NON-PENETRATING AND GROUTED AND COATED.

STANDARD WASTEWATER PRE-CAST MANHOLE

N.T.S.

DESOTO COUNTY	STANDARD WASTEWATER PRE-CAST MANHOLE N.T.S.	SEWER DWG. NO. 2

SANSWR.DWG 07/22/05



NOTE:

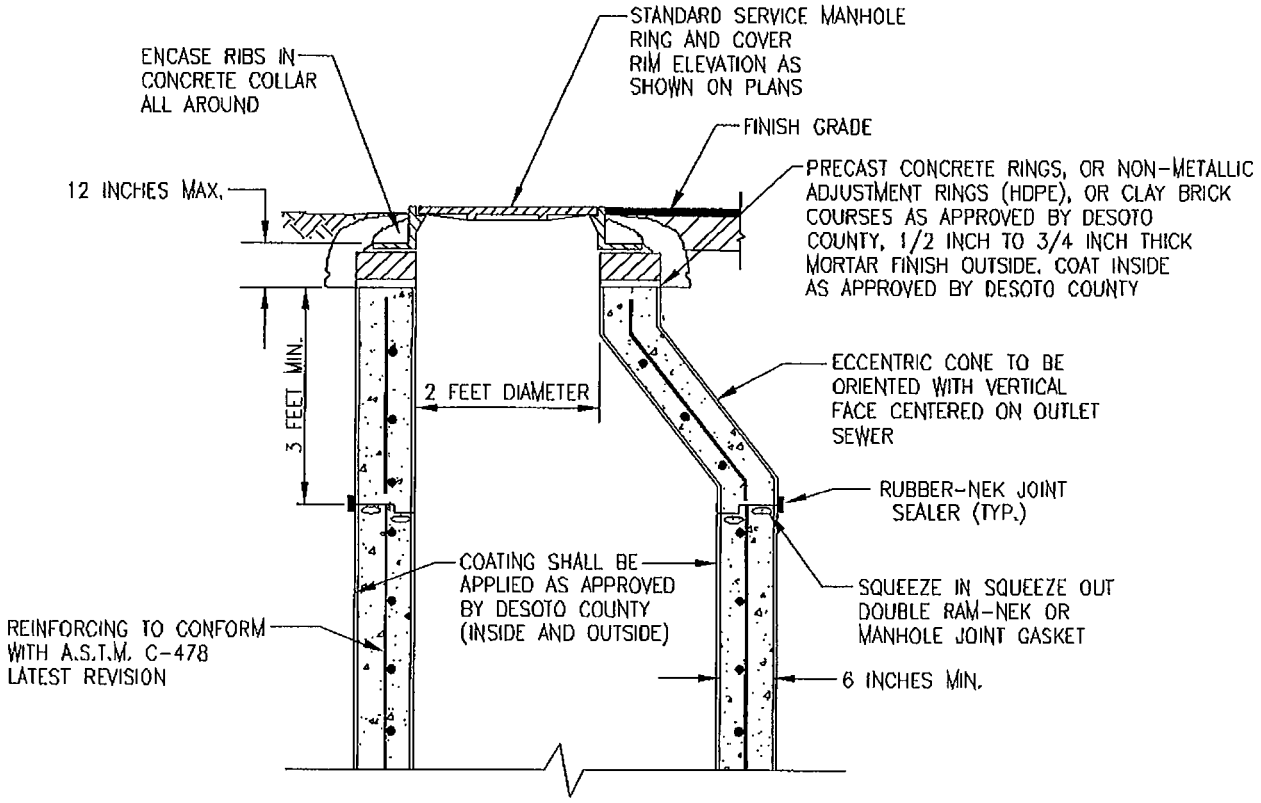
1. MANHOLE SHALL CONFORM TO A.S.T.M. C-478 LATEST REVISION TYPE II CONCRETE, 4000 P.S.I. 28 DAY COMPRESSIVE STRENGTH.
2. INTERCEPTOR MANHOLES, DROP MANHOLES, AND MANHOLES WITH INTERCEPTING FORCE MAINS SHALL BE LINED AS APPROVED BY DESOTO COUNTY.
3. LIFTING HOLES SHALL BE NON-PENETRATING AND GROUTED AND COATED.

STANDARD PRECAST SHALLOW MANHOLE

N.T.S.

SHALMH.DWG 07/22/05

DESOTO COUNTY	STANDARD PRECAST SHALLOW MANHOLE N.T.S.	SEWER DWG. NO. 3



NOTE:

1. MANHOLE SHALL CONFORM TO A.S.T.M. C-478 LATEST REVISION TYPE II CONCRETE, 4000 P.S.I. 28 DAY COMPRESSIVE STRENGTH
2. INTERCEPTOR MANHOLES, DROP MANHOLES, AND MANHOLES WITH INTERCEPTING FORCE MAINS SHALL BE LINED AS APPROVED BY DESOTO COUNTY
3. LIFTING HOLES SHALL BE NON-PENETRATING AND GROUTED AND COATED.

SWRECC.DWG 07/22/05

STANDARD SANITARY SEWER PRE-CAST MANHOLE ECCENTRIC CONE DETAIL

N.T.S.

DESOTO COUNTY	STANDARD SANITARY SEWER PRE-CAST MANHOLE ECCENTRIC CONE DETAIL N.T.S.	SEWER DWG. NO. 4

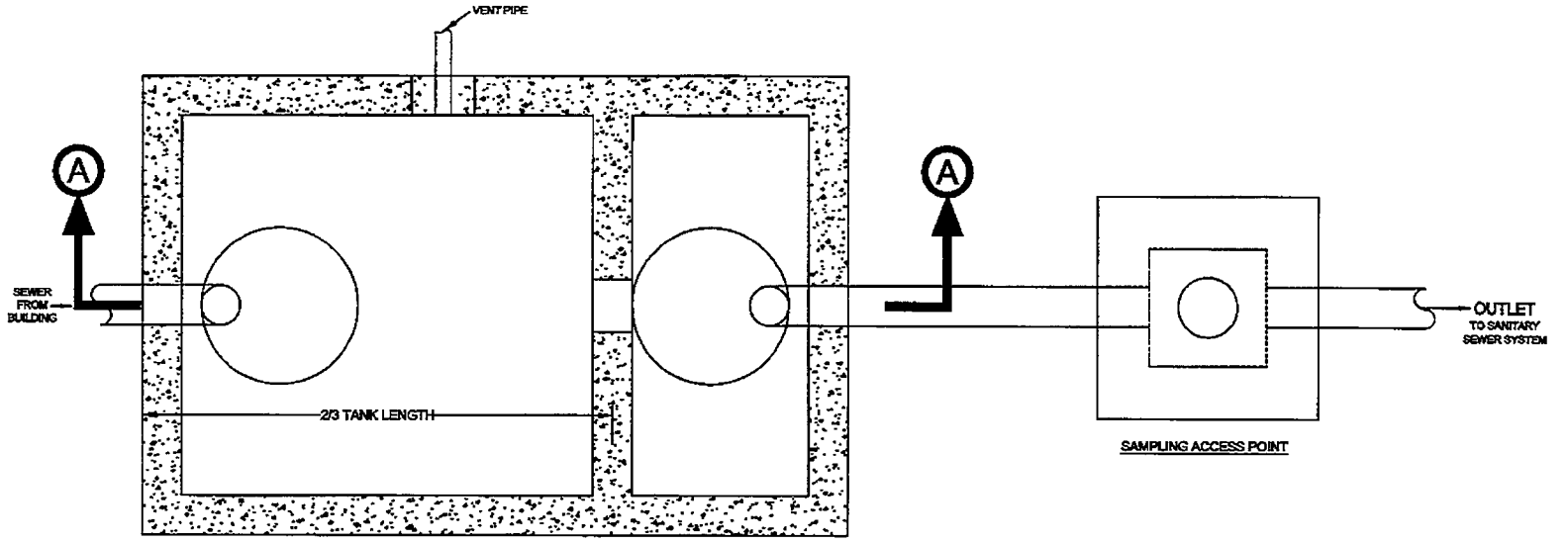
DATE: 1/1/2008

DRAWN BY:

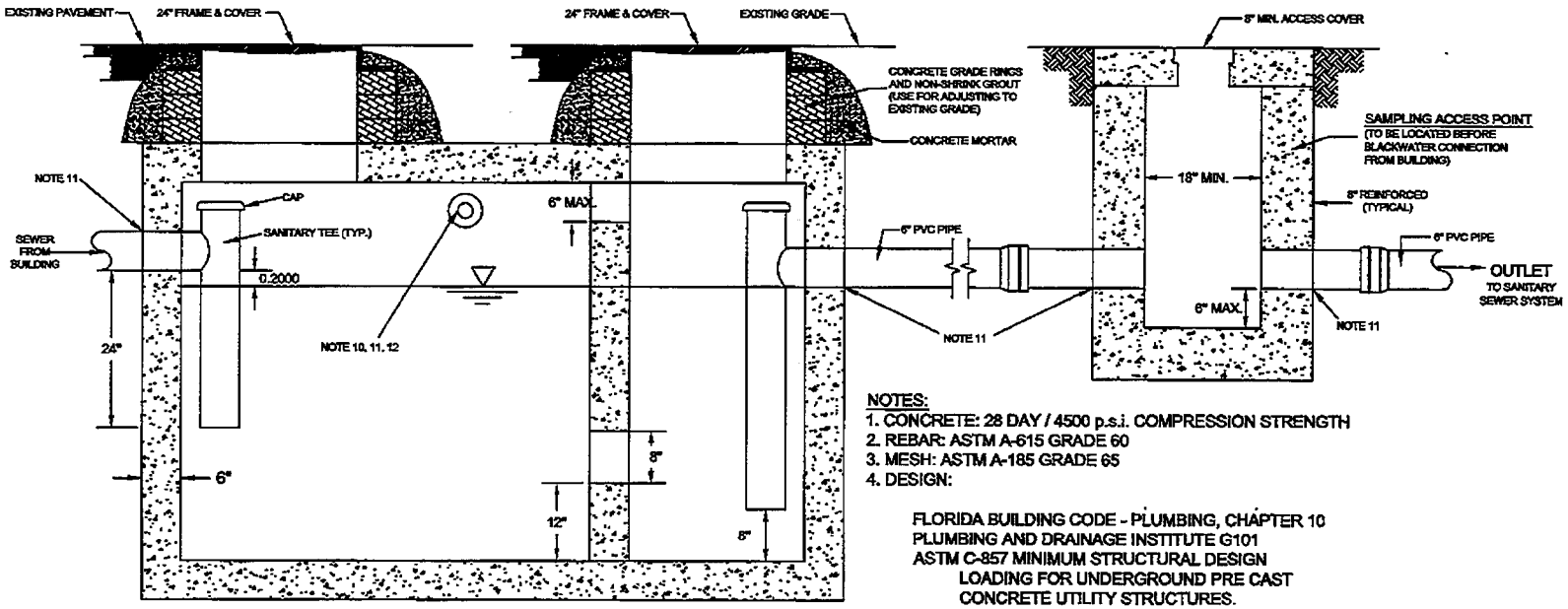
APPROVED BY:

GREASE INTERCEPTOR TANK
W/ SAMPLE POINT DETAIL

DESOTO COUNTY UTILITIES



PLAN VIEW



SECTION "A-A"

NOTES:

1. CONCRETE: 28 DAY / 4500 p.s.i. COMPRESSION STRENGTH
2. REBAR: ASTM A-615 GRADE 60
3. MESH: ASTM A-185 GRADE 65
4. DESIGN:

   FLORIDA BUILDING CODE - PLUMBING, CHAPTER 10
   PLUMBING AND DRAINAGE INSTITUTE G101
   ASTM C-857 MINIMUM STRUCTURAL DESIGN
   LOADING FOR UNDERGROUND PRE CAST
   CONCRETE UTILITY STRUCTURES.
   6" MINIMUM WALL THICKNESS
   PREVENT FLOATATION WHEN EMPTY
5. LOADS: H-20 TRUCK WHEEL W/30% IMPACT PER AASHTO
6. COMPLETE STRUCTURE AND PIPING TO BE WATERTIGHT
7. FILL WITH CLEAN WATER PRIOR TO START UP OF SYSTEM
8. CONTRACTOR TO SUPPLY AND INSTALL ALL PIPING AND SANITARY TEES, CLEAN OUTS FOR CLEANING TOWARD INTERCEPTOR AND FOR CLEANING AWAY FROM INTERCEPTOR ON BOTH THE INLET AND OUTLET / ALT. DUAL SWEEP CLEAN OUTS
9. GRAY WATER ONLY, BLACK WATER SHALL BE CARRIED BY SEPARATE SEWER TO A POINT DOWNSTREAM OF THE GREASE INTERCEPTOR.
10. 4" DIAMETER VENT HOLE.
11. BOOT TO BE SUPPLIED WITH TANK.
12. SEAL HOLE IF VENT NOT INSTALLED.

PAGE No. 43

NUMBER: S-05-GIT

RESTAURANT WITH PAPER PLATES				
INTERCEPTOR VOLUME (GALLONS) @ X HOURS OF RESTAURANT OPERATIONS PER DAY				
SEATS UP TO	<4 HOURS CLASS 1 & 2	4-8 HOURS CLASS 3 & 4	8-12 HOURS CLASS 5	GREATER THAN 12 HOURS CLASS 6
25	750	750	750	750
50	750	750	750	750
75	750	750	750	1000
100	750	750	1000	1250
125	750	1000	1250	1600
150	750	1000	1600	2000
175	750	1250	2000	2500
200	750	1600	2000	2500
250	1000	2000	2500	3000
>250	SUBMIT DESIGN USING FLORIDA BUILDING CODE - PLUMBING, TABLE 1003.5.1			

EXAMPLE:
125 SEAT RESTAURANT THAT SERVES MEALS IN BASKETS WITH PLASTIC FORKS AND KNIVES (SO SERVICE DISHES WASHED) THAT IS OPEN 8 HOURS A DAY. A MINIMUM SIZE GREASE INTERCEPTOR REQUIRED IS 833 GALLONS CAPACITY. LOCAL AVAILABILITY OF A GREASE INTERCEPTOR MAY REQUIRE THE NEXT LARGEST MANUFACTURED SIZE OF 1,000 GALLONS CAPACITY.

RESTAURANT WITH CHINA PLATES				
INTERCEPTOR VOLUME (GALLONS) @ X HOURS OF RESTAURANT OPERATIONS PER DAY				
SEATS UP TO	<4 HOURS CLASS 1 & 2	4-8 HOURS CLASS 3 & 4	8-12 HOURS CLASS 5	GREATER THAN 12 HOURS CLASS 6
25	750	750	750	750
50	750	1000	1250	1600
75	750	1250	2000	2500
100	1000	2000	2500	3000
125	1250	2000	3500	4000
150	1250	2500	4000	4500
175	1600	3000	4500	5100
200	2000	3500	5000	5800
250	2000	4500	6250	7300
>250	SUBMIT DESIGN USING FLORIDA BUILDING CODE - PLUMBING, TABLE 1003.5.1			

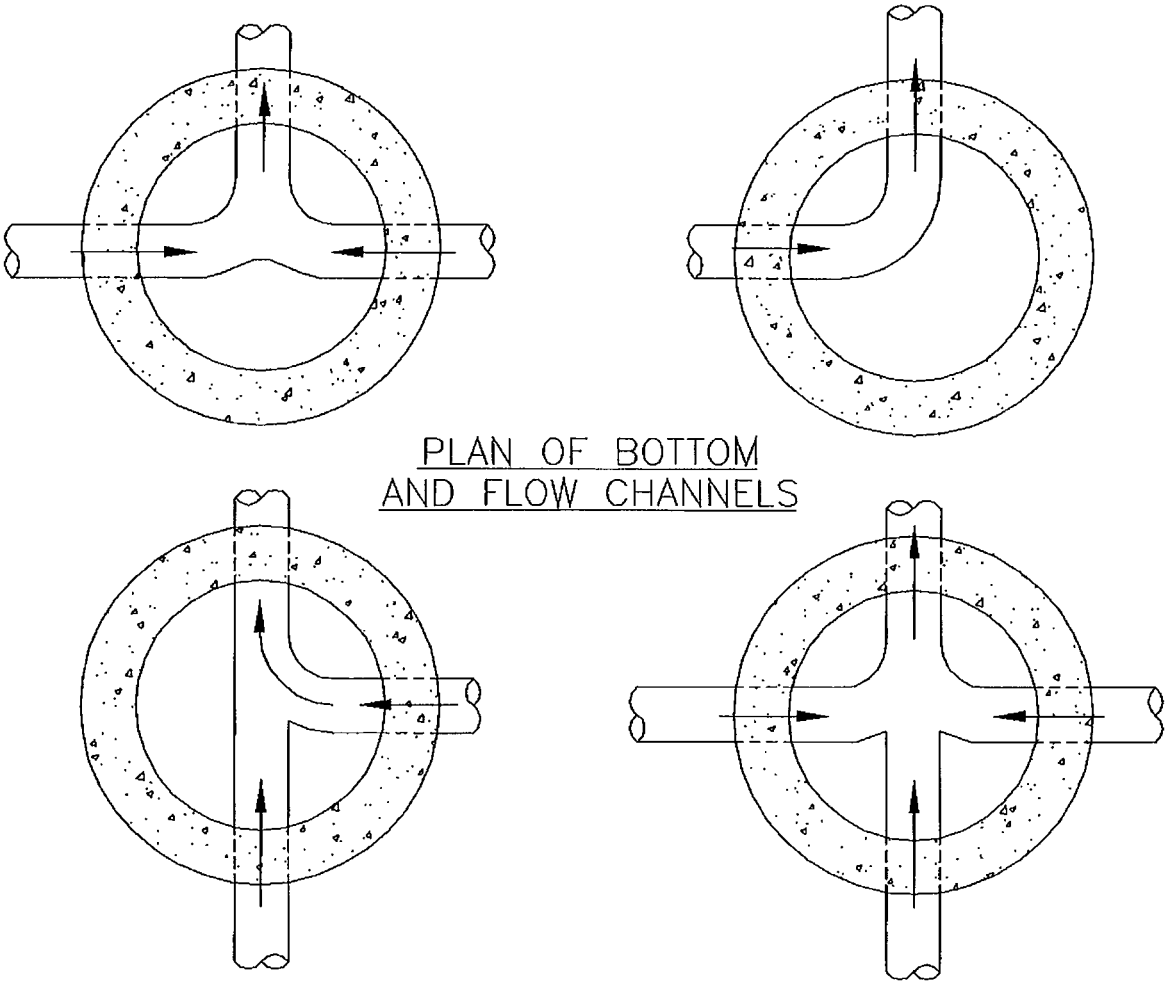
EXAMPLE:
100 SEAT RESTAURANT THAT SERVES MEALS ON WASHABLE PLATES (CHINA) THAT IS OPEN 8 HOURS A DAY. THE MINIMUM SIZE GREASE INTERCEPTOR REQUIRED IS 1,667 GALLONS CAPACITY. LOCAL AVAILABILITY OF A GREASE INTERCEPTOR MAY REQUIRE THE NEXT LARGEST MANUFACTURED SIZE OF 2,000 GALLONS CAPACITY.

GREASE INTERCEPTOR VOLUME REQUIREMENT

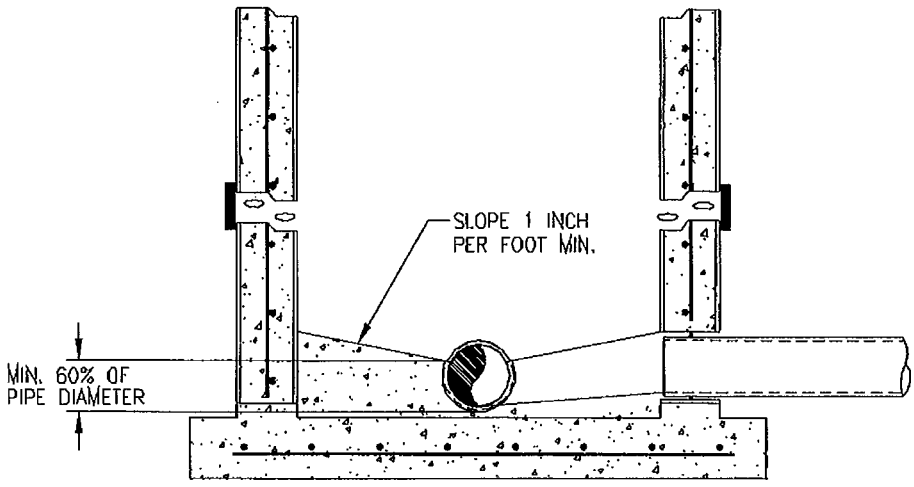
NOTES:
1. MINIMUM SIZE IS 750 GALLONS
2. INTERCEPTOR TANKS MAY BE PLACED IN SERIES TO ACHIEVE TOTAL VOLUME
3. THE RESTAURANT GREASE INTERCEPTOR SIZE TABLE ABOVE IS BASED ON TABLE 1003.5.1, FLORIDA PLUMBING CODE. REFER TO TABLE 1003.5.1 FOR DESIGN OF GREASE INTERCEPTORS THAT ARE REQUIRED FOR OTHER ESTABLISHMENTS WITH COMMERCIAL KITCHENS
4. GREASE INTERCEPTORS MUST COMPLY WITH FLORIDA BUILDING CODE, PLUMBING, CHAPTER 10 - TRAPS, INTERCEPTORS AND SEPARATORS.

CLASS 1 = BREAKFAST ONLY, CLOSED BY 11:00AM, OPEN <4 HOURS
CLASS 2 = LUNCH ONLY, CLOSED BY 3:00 PM, OPEN <4 HOURS
CLASS 3 = DINNER ONLY, OPEN 4-8 HOURS
CLASS 4 = BREAKFAST & LUNCH, OPEN 4-8 HOURS
CLASS 5 = LUNCH & DINNER, OPEN 8-12 HOURS
CLASS 6 = ALL MEALS, OPEN MORE THAN 12 HOURS

DATE: 1/1/2008	GREASE INTERCEPTOR VOLUME REQUIREMENT	PROVIDED FOR INFORMATIONAL PURPOSES ONLY. NO MODIFICATIONS WITHOUT WRITTEN CCU APPROVAL.
DRAWN BY: DEC		PAGE No. 44
APPROVED BY: TGD	DESOTO COUNTY UTILITIES	NUMBER: S-05.5-GIT-TBL



PLAN OF BOTTOM
AND FLOW CHANNELS



TYPICAL SECTION

MANHOLE FLOW CHANNELS

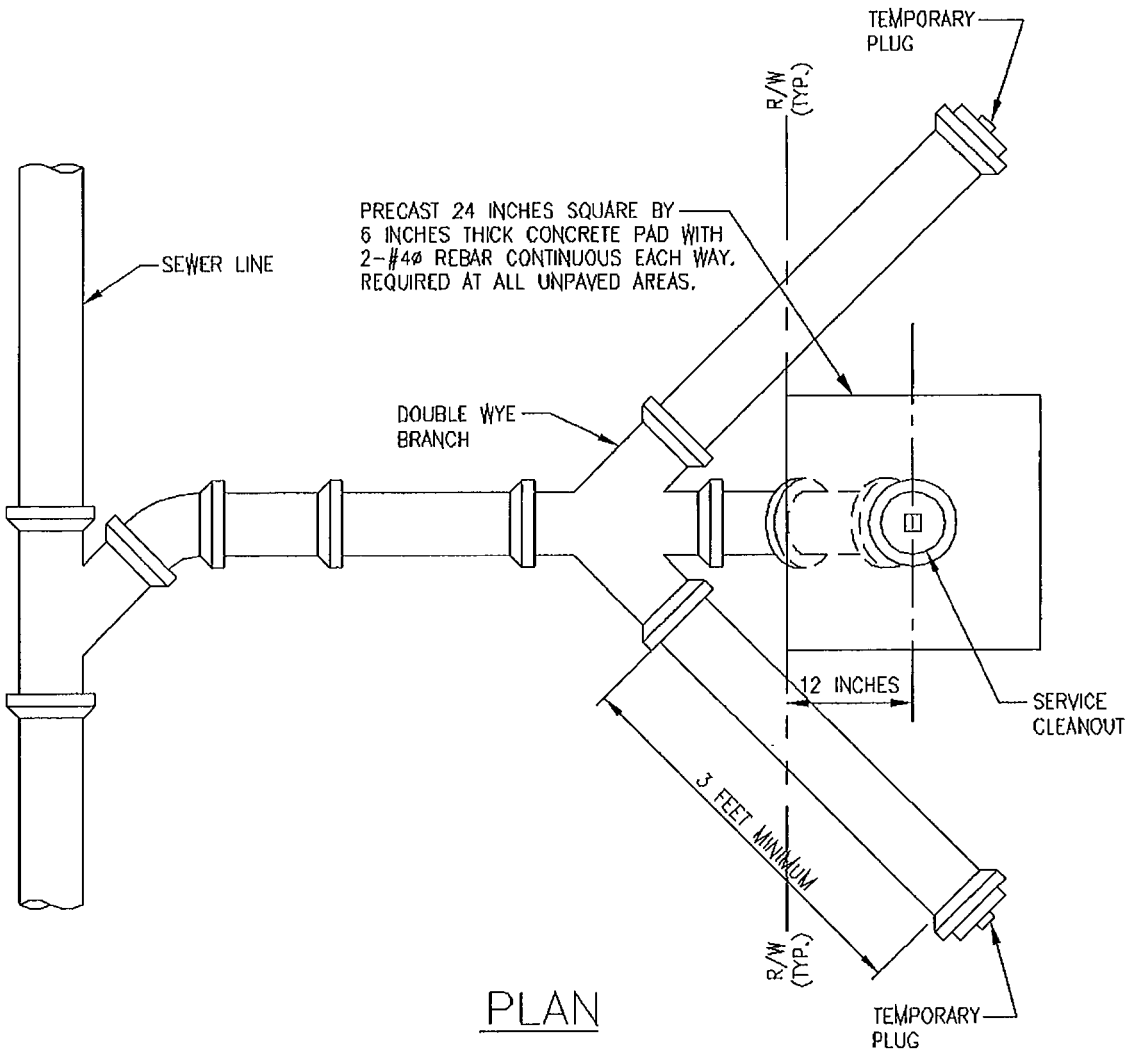
N.T.S.

DESOTO COUNTY	MANHOLE FLOW CHANNELS N.T.S.	SEWER DWG. NO. 7

FLOWCHAN.DWG 07/22/05

CLEAN-OUT STANDARDS

EACH SERVICE OR DOUBLE WYE SERVICE SHALL HAVE A CLEAN-OUT BROUGHT TO THE PROPERTY LINE OR CLEAN-OUTS SHALL BE INSTALLED ACCORDING TO THE APPLICABLE SEWER SPECIFICATIONS.



PLAN

GENERAL NOTES:

1. LOCATION OF CLEAN-OUT TO BE MARKED AT CURB OR EDGE OF ASPHALT WITH BRASS DISC WITH NUMBER OF FEET.

SERVICE2.DWG 07/22/05

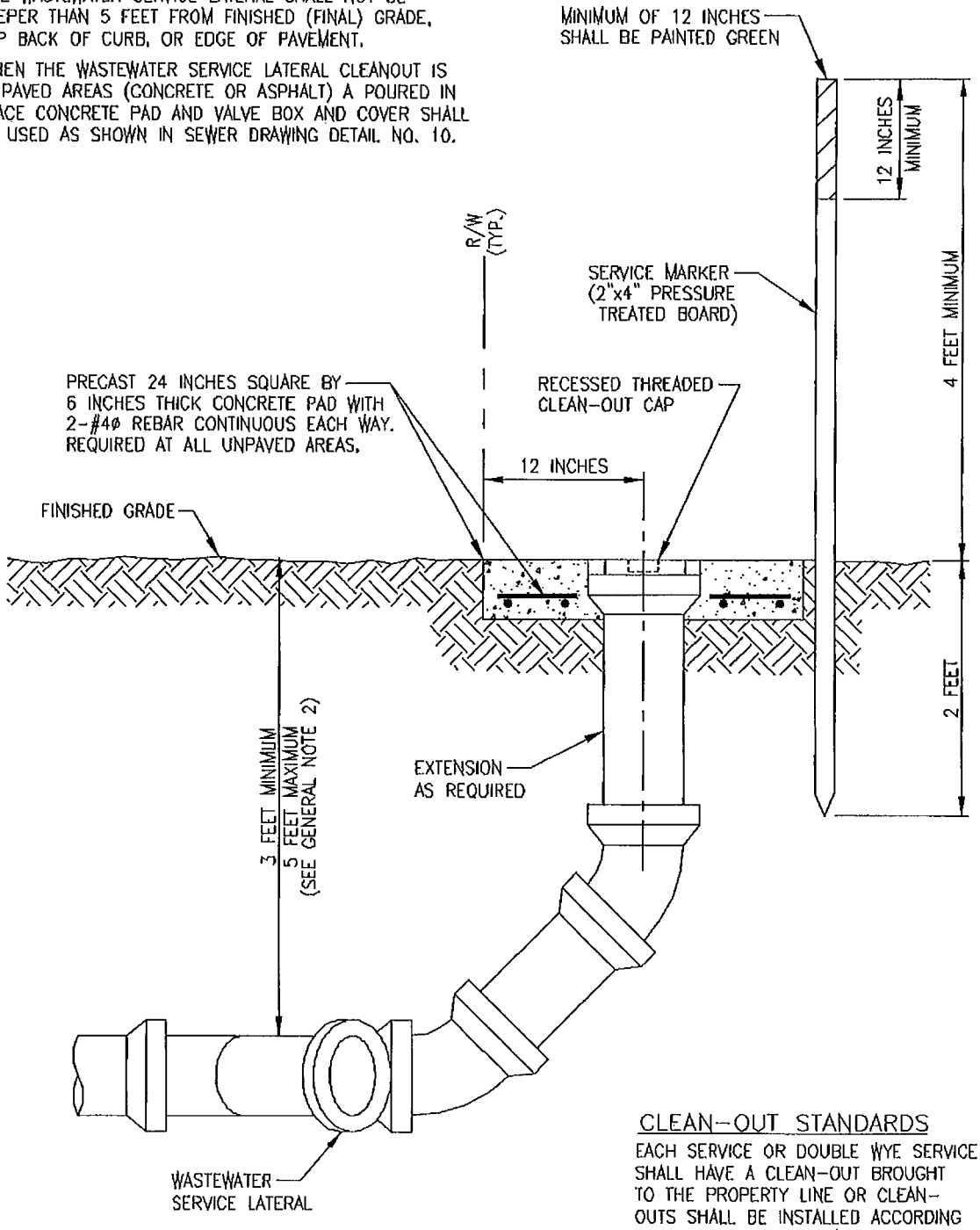
DOUBLE SERVICE SANITARY SEWER

N.T.S.

DESOTO COUNTY	DOUBLE SERVICE SANITARY SEWER N.T.S.	SEWER DWG. NO. 8

GENERAL NOTES:

1. LOCATION OF CLEAN-OUT TO BE MARKED AT CURB OR EDGE OF ASPHALT WITH BRASS DISC WITH NUMBER OF FEET.
2. THE WASTEWATER SERVICE LATERAL SHALL NOT BE DEEPER THAN 5 FEET FROM FINISHED (FINAL) GRADE, TOP BACK OF CURB, OR EDGE OF PAVEMENT.
3. WHEN THE WASTEWATER SERVICE LATERAL CLEANOUT IS IN PAVED AREAS (CONCRETE OR ASPHALT) A POURED IN PLACE CONCRETE PAD AND VALVE BOX AND COVER SHALL BE USED AS SHOWN IN SEWER DRAWING DETAIL NO. 10.



CLEAN-OUT STANDARDS

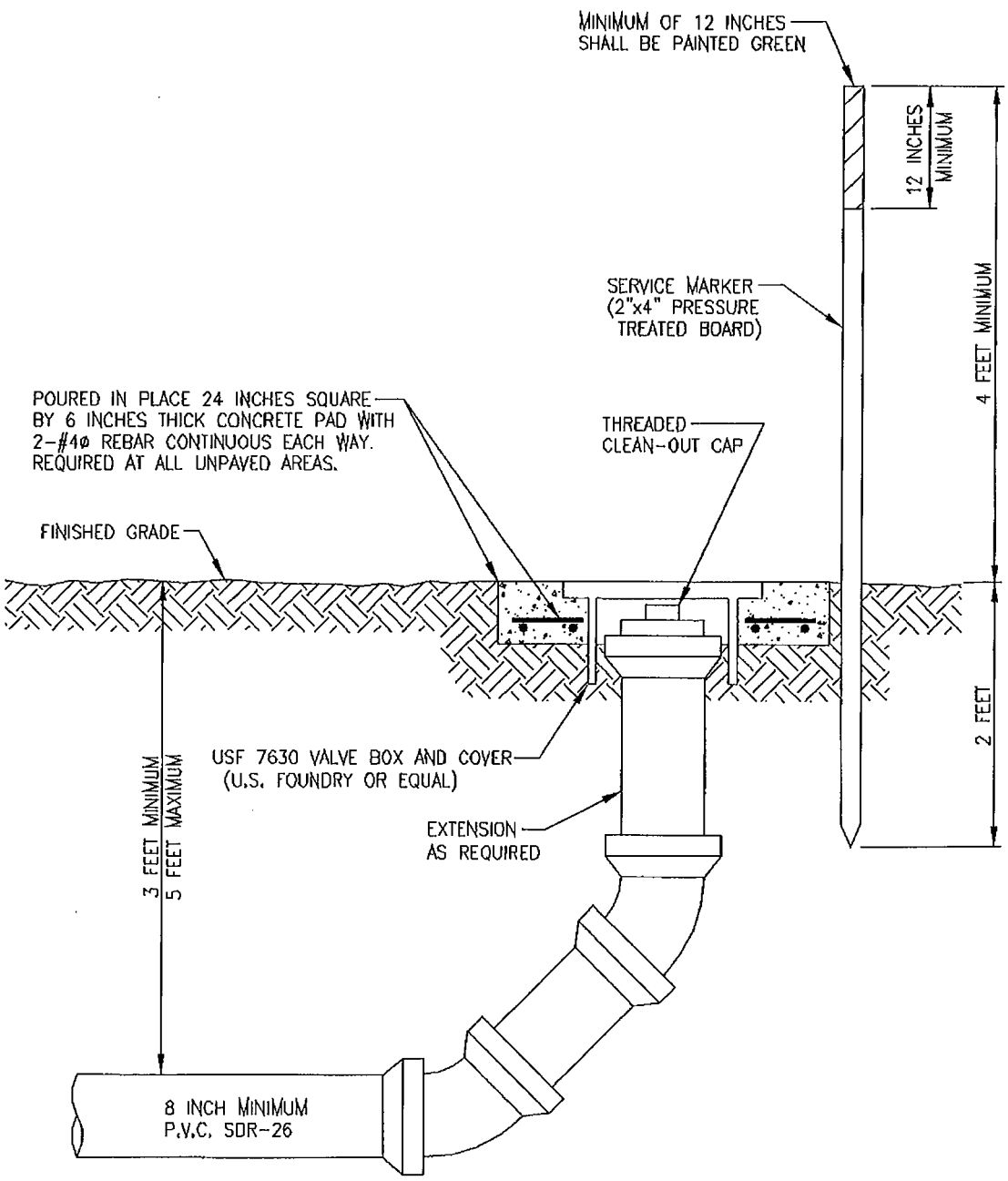
EACH SERVICE OR DOUBLE WYE SERVICE SHALL HAVE A CLEAN-OUT BROUGHT TO THE PROPERTY LINE OR CLEAN-OUTS SHALL BE INSTALLED ACCORDING TO THE APPLICABLE SEWER SPECIFICATIONS.

SERVICE CLEAN-OUT

N.T.S.

CLEANOUT.DWG 07/22/05

DESOTO COUNTY	SERVICE CLEAN-OUT N.T.S.	SEWER DWG. NO. 9



MAIN LINE TERMINAL CLEAN-OUT

N.T.S.

TERMNLCO.DWG 07/22/05

DESOTO COUNTY	MAIN LINE TERMINAL CLEAN-OUT N.T.S.	SEWER DWG. NO. 10

ITEM	DESCRIPTION
(1)	WET WELL: Shall be a minimum of 6 foot inside diameter precast concrete meeting "Standard Specifications for Precast Reinforced Concrete Manhole", A.S.T.M. C-478 latest revision.
(2)	PUMP: Hydromatic submersible non-clog pump, includes 316, SCH 40 S.S. guide rails with S.S. intermediate support. Pump shall be equipped with seal failure sensors and heat sensors. Locate pump in proper relation to cover opening to insure accurate alignment of guide rails. Anchor pump discharge connection to well floor with appropriate expansion shields. Do not use pump model S4P.
(3)	CHECK VALVE: with lever and weight, and rubber faced clapper.
(4)	PLUG VALVE: Eccentric operating, non-lubricated, round port, Buna N resilent face seating surface, cast iron body, lever actuated with lever provided, Pratt Ballcentric or Milliken Millcentric. Valves shall be epoxy coated inside and out with Amercoat 400, or equal. The epoxy coating shall be a minimum of 8 mils inside and 4 mils outside.
(6)	LEVEL CONTROLS: Each shall be provided with thirty (30) feet of electric cable and weights connected to bail. No splicing allowed.
(7)	WET WELL ACCESS HATCH COVER: Shall have a clear opening of a minimum of 36 inch by 48 inch. Access frame and covers shall be 1/4 inch aluminium diamond pattern plate. Frame shall support guide rails and stainless steel cable holder. Covers shall be provided with lifting handle and safety latch to hold cover in open position. Locking hasps shall be furnished for each cover. Stainless steel hardware shall be used throughout. All surfaces in contact with concrete shall have a shop coat of zinc chromatic primer, approved alkali resilient paint, or other approved protective coating. Live Load = 300 p.s.f.
(8)	ARV, Val Matic 801ABW, Crispin US10SB-SC, or ARI D-020-S, with blow-off hose to atmosphere. All ARV's to have fusion bonded epoxy inside and out with 316 SST internals, or equal. All ARV's to have 2" inlets, 1" outlets, and 0.25" orifices, or comparable. All ARV assemblies to have SST ball valves for isolation and backwash.
(9)	Preformed Boots with stainless steel band.
(10)	Vent Pipe 4" flanged Sch. 80 P.V.C. with 1/4" mesh stainless steel screen between flanged fittings. Locate behind hatch.
(11)	Supply lightning protection and a minimum of 5 ground rods in a halo around the equipment area to provide a ground resistance not greater than 3 ohms.
(12)	SST oil filled pressure gauge with diaphram, isolation valve, and piping shall be provided on the common pump discharge pipe, 0-60 psi.
(13)	Pipe supports shall be concrete saddles or Grinell Fig. 259, or equal, SST, each with 0.25 inch neoprene padding.
(14)	Link-seal hydrostatic pipe wall closure with non-shrink grout on each side.

LSSCHEDA.DWG 07/22/05

DESOTO COUNTY	LIFT STATION SCHEDULE N.T.S.	SEWER DWG. NO. 11

STANDARDS FOR LIFT/PUMP STATIONS

1. The top of the wet well slab and the top of the control panel/RTU slab shall be at the same elevation at the top of the lift station site.

2. Install 6 inches of compacted 1 inch, washed, crushed shell over one layer of weed barrier over all exposed ground surfaces. One layer of weed barrier is to be laid and extend to a line 4 feet outside of the fence line. The weed barrier shall be Mirascape manufactured by Mirafi or approved equal. All finished grade surfaces shall slope away from the concrete slabs at a minimum slope of 2%, extending to a line 4 feet outside of the fence line. All disturbed ground shall be compacted to 95% max density, AASHTO T-180, before installing the weed barrier.

3. All lift station driveways shall be 6-inch thick Class I, minimum 3,000 psi, Fibermesh reinforced concrete with 3 lbs/cy of 100% virgin polypropylene collated, fibrillated fibers from Fibermesh Co. or equal, extending from the back of the curb to one foot inside the fence gate opening. The 12-foot wide driveway shall align with the center of the fence gate and the wet well. The top 12-inches of the driveway subgrade shall be compacted to 98% density, AASHTO T-180.

4. DIP shall be used for all process piping from the pumps through the buried main cut-off valve. All DIP and fittings within the wet well and above ground shall be Class 53 flanged joint. All buried DIP and fittings shall be Class 150 restrained mechanical joint. All DIP and fittings used within the lift station site shall be lined on the interior with a minimum of 40 mils of Protecto 401 Ceramic Epoxy. All DIP and fittings used within the wet well shall be coated on the exterior with a minimum of 25 mils of Ceramawrap Epoxy. All other exposed DIP and fittings shall be coated on the exterior with a minimum of 11 mils of Tnemec Series 66 Polyamide Epoxy, or equal. All buried DIP and fittings shall be coated on the exterior with a minimum of 1 mil of manufacturer's standard asphalt.

5 All hardware within the wet well shall be 316 SST; all piping nuts and bolts outside of the wet well shall be a minimum of A-307 carbon steel and shall be painted the same color as the pipe. Washers shall be used with all flanged joint bolts, using the same material as the nuts and bolts.

6. Survey markers, steel bar and cap, shall mark the exact easement lines of the lift station site.

7. Electrical, instrumentation, and control drawings shall be laminated and placed inside the control panel.

8. The hose bibb assembly shall be firmly attached inside and within 2 feet of the fence to 5x5 concrete posts, or equal, and shall be a minimum of 24 inches above finish grade. The riser pipe shall be rigid copper in accordance with the latest version of the Sarasota County Backflow Ordinance.

9. Prior to acceptance of the lift station, the site shall be completely cleared of all construction debris, the wet well shall be washed down, the control panel shall be cleaned of all metal shavings, all piping shall be finish coated, and the lift/pump station shall be tested and found to be fully operational.

10. All above ground piping shall be color coated: blue for potable water (Tnemec Safety Blue, SC06), green for wastewater (Tnemec Malachite, PL19), and purple for reuse (Behr Pantone 522C).

11. The location of all buried piping and electrical conduits are to be included on the Record Drawings.

12. For electrical service, provide a commercial meter can and a 100 amp (minimum) fuse-type main disconnect meeting the latest electrical codes and requirements of FPL. The main disconnect shall be housed in an enclosure with padlock latch. A secondary surge arrestor of the appropriate voltage and phase shall be furnished and installed by the Contractor. The control panel and junction box shall be designed to minimize wire bending. All transformers to be located outside of panels. The electrical power shall be 3-phase, 480 volts.

LSSCHSTD.DWG 07/22/05

DESOTO COUNTY	LIFT STATION SCHEDULE N.T.S.	SEWER DWG. NO. 11A

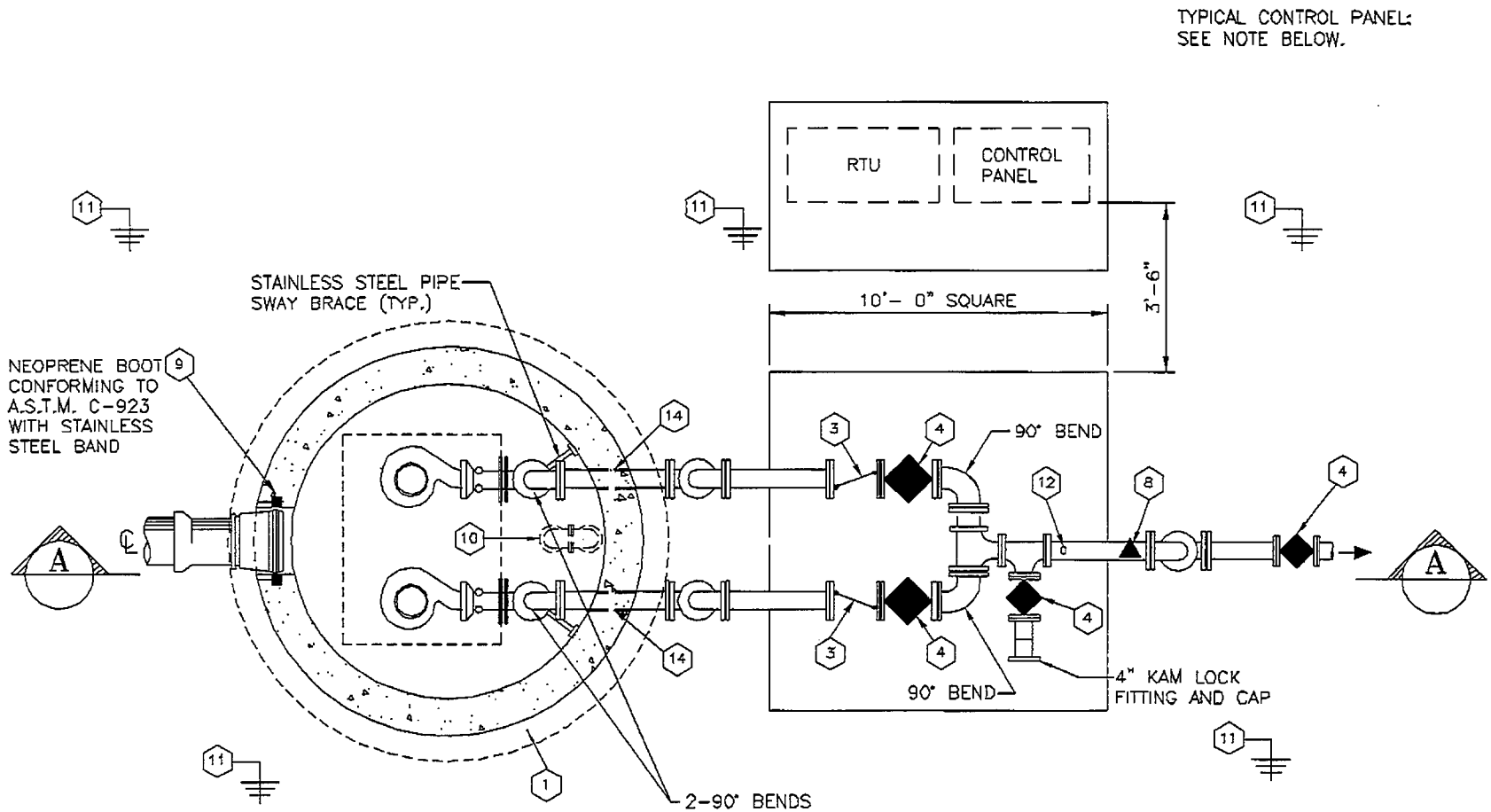
LSPLNVW1.DWG 07/22/05

DESOTO COUNTY

PLAN VIEW BELOW COVERS

N.T.S.

SEWER DWG. NO. 12



NOTES:

1. ALL NUTS, BOLTS, PUMP CABLE HANGER AND ASSOCIATED HARDWARE INSIDE WETWELL TO BE STAINLESS STEEL, 316.
2. CONTROL PANEL TO BE FABRICATED AND INSTALLED PER DESOTO COUNTY'S LATEST STANDARD FABRICATION AND INSTALLATION PLANS FOR CONTROL PANELS.

PLAN VIEW BELOW COVERS

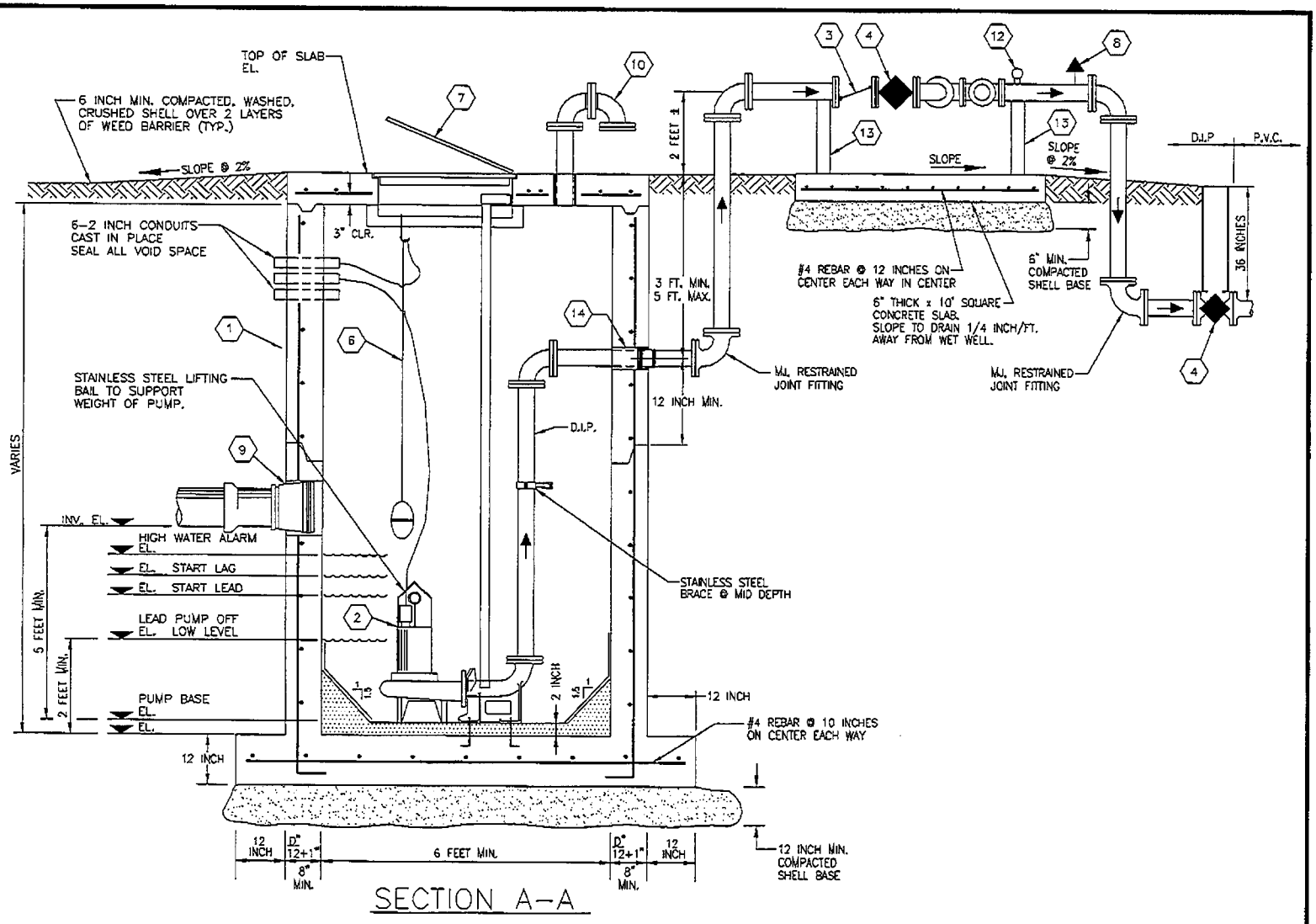
LSSECAA1.DWG 07/22/05

DESOTO COUNTY

LIFT STATION SECTION A-A

N.T.S.

SEWER DWG. NO. 13



SECTION A-A

LSTOPSLB.DWG 07/22/05

DESOTO COUNTY

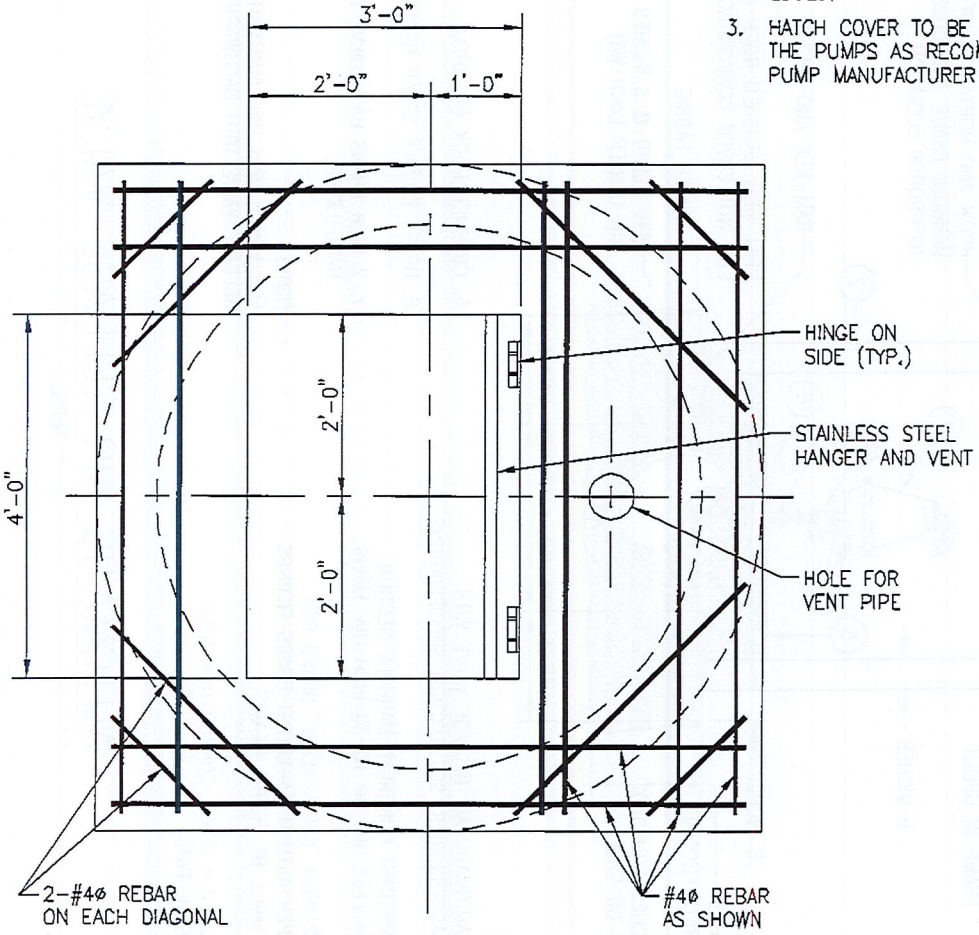
TOP SLAB REINFORCEMENT DETAIL

N.T.S.

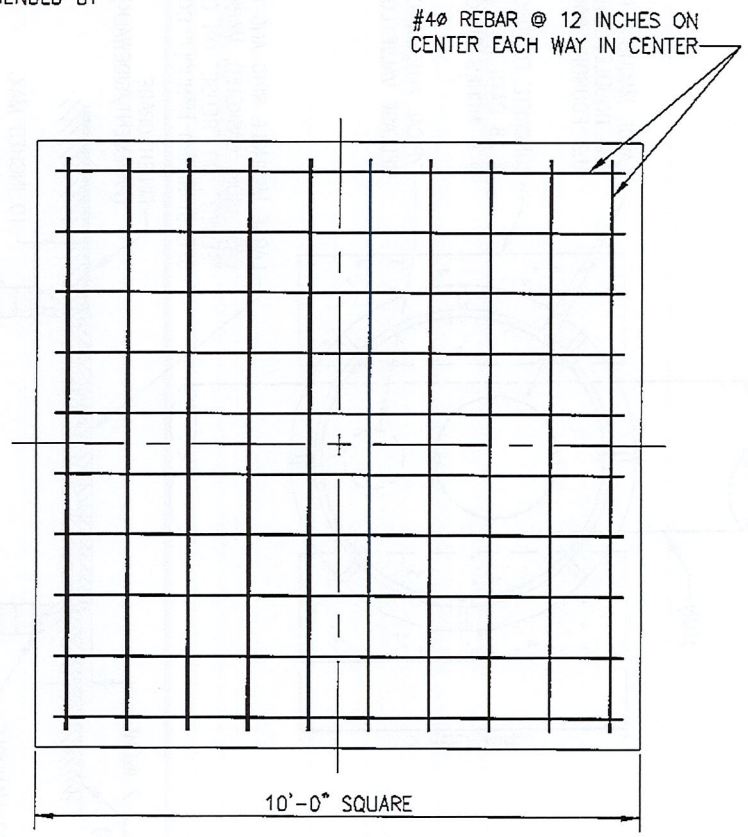
SEWER DWG. NO. 14

NOTES:

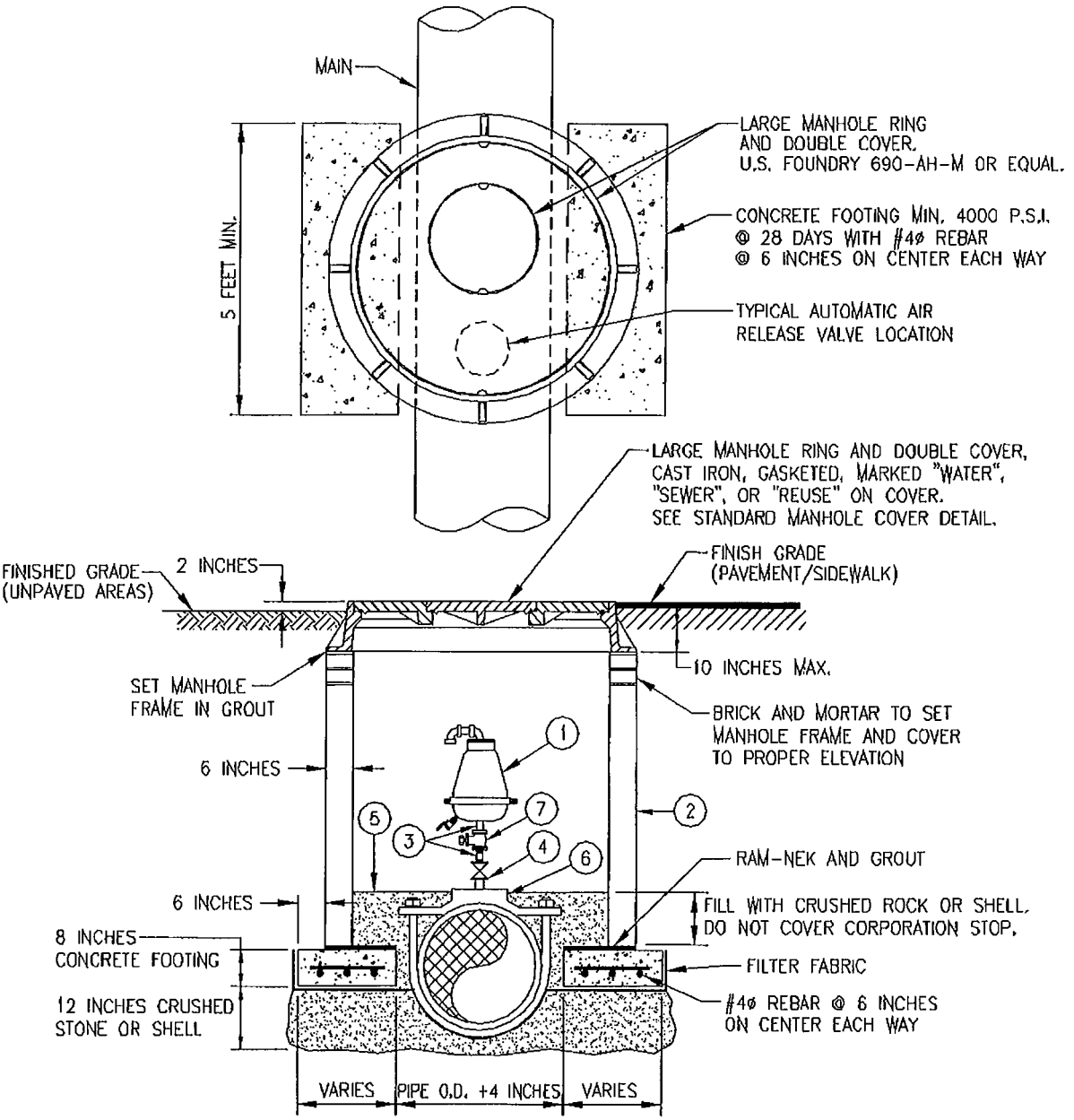
1. ALL STEEL 3 INCH CLEAR OF ANY EXPOSED SURFACE.
2. 1 INCH CHAMFER ON ALL EXPOSED EDGES.
3. HATCH COVER TO BE CENTERED OVER THE PUMPS AS RECOMMENDED BY PUMP MANUFACTURER



WET WELL



VALVE PAD



1. AUTOMATIC AIR RELEASE VALVE WITH ACCESSORIES. SEE SECTION SPECIFICATIONS.
2. PRECAST CONCRETE MANHOLE SECTION, 4 FEET DIA. UP TO 30 INCH DIA. MAINS.
3. 2 INCH "EXTRA HEAVY" BRASS PIPE PER ASTM B 43-LATEST BRASS FITTINGS SHALL BE "EXTRA HEAVY".
4. 2 INCH BRASS CORPORATION STOP BALL TYPE
5. CRUSHED ROCK OR SHELL
6. BRASS DOUBLE STRAP SERVICE SADDLE
7. 2 INCH BRASS BALL VALVE WITH HAND LEVER.

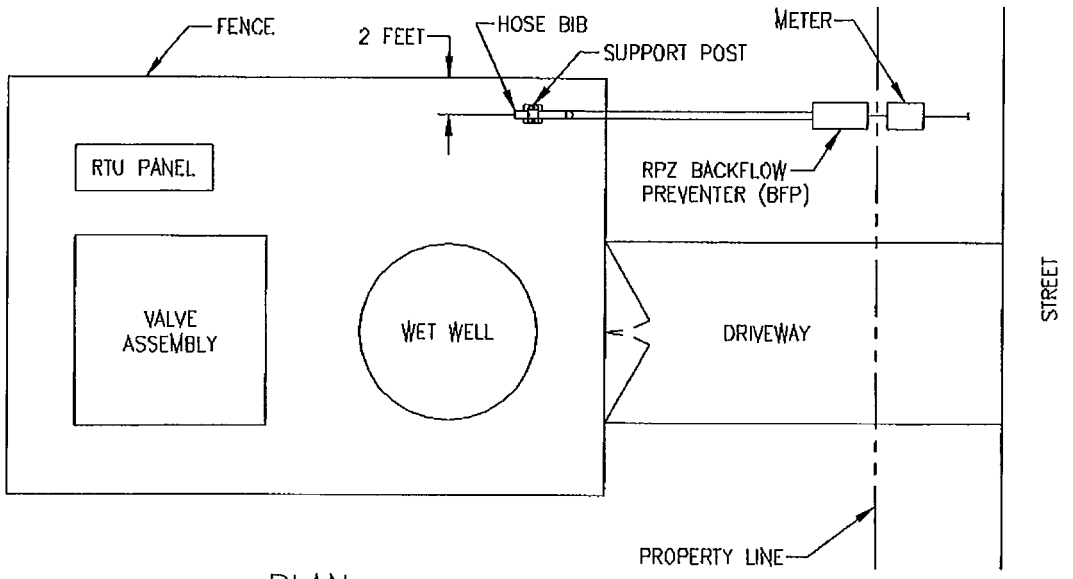
NOTE:
FOR FORCE MAIN USE AUTOMATIC VACUUM AIR RELEASE VALVE WITH BACKWASH ACCESSORIES.

AUTOMATIC AIR RELEASE VALVE

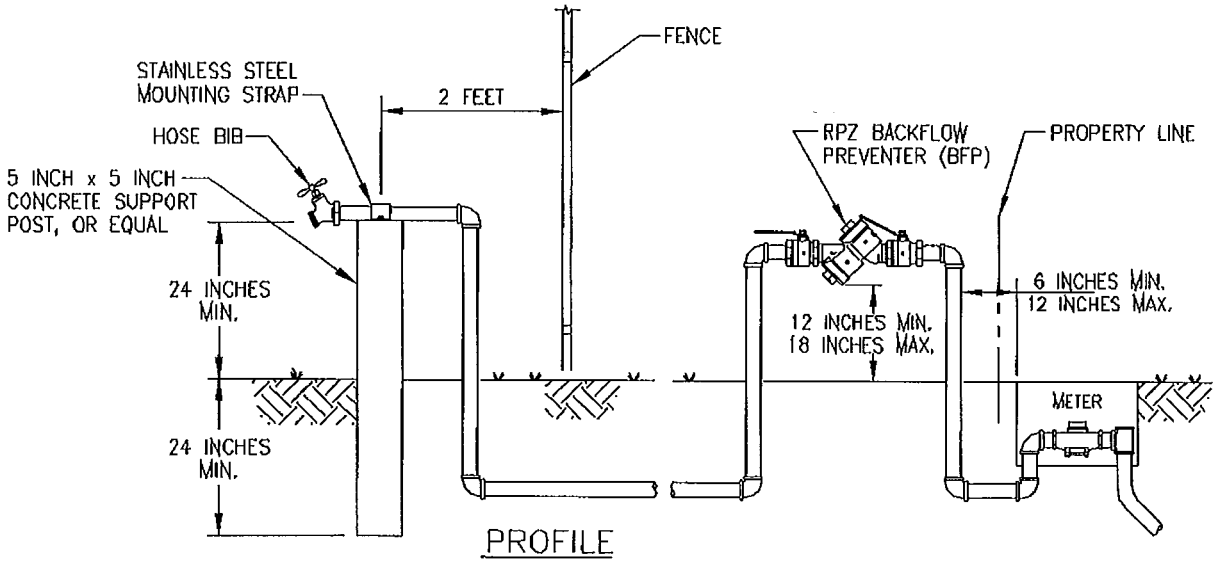
N.T.S.

AUTOAIR.DWG 07/22/05

DESOTO COUNTY	AUTOMATIC AIR RELEASE VALVE N.T.S.	SEWER DWG. NO. 15



PLAN



PROFILE

NOTES:

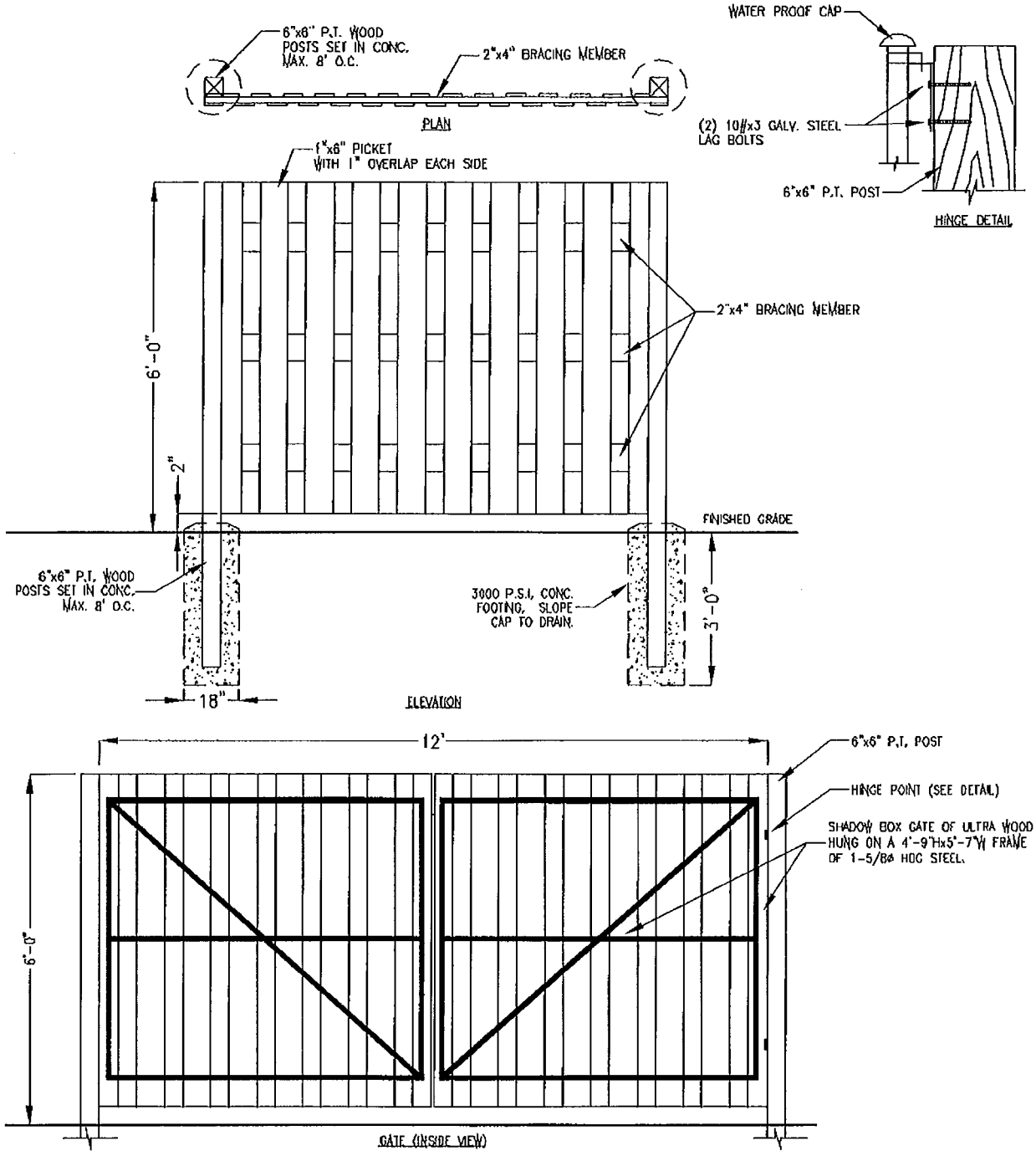
1. METER AND REDUCED PRESSURE BACKFLOW PREVENTER (BFP) SHALL BE ON THE OUTSIDE OF THE FENCE AT THE PROPERTY LINE.
2. NONE OF THE SERVICE LINE TO THE METER SHALL BE UNDER THE DRIVEWAY OR ANY OTHER OBSTRUCTION.
3. HOSE BIB SHALL EXTEND PAST SUPPORT POST.

LIFT STATION, METER, & BFP LOCATION

N.T.S.

LSMBFLOC.DWG 087/22/05

DESOTO COUNTY	LIFT STATION, METER, & BFP LOCATION N.T.S.	SEWER DWG. NO. 16



NOTE:

1. ALL WOOD SHALL BE PRESERVE PLUS ACQ, CYPRESS, CEDAR, OR EQUAL
2. 6"x6" POSTS SHALL BE USED THROUGHOUT.
3. GATES SHALL BE REINFORCED WITH 1-1/2"ø HOT DIP GALVANIZED STEEL.
4. HARDWARE SHALL BE A MINIMUM 5/8" HOT DIP GALVANIZED STEEL.
5. GATE TO BE SECURED WITH DROP BAR WITH PADLOCK AND HASP. DROP BAR TO FIT 1" SCH. 40 GSP IN 12"øx18" DEEP CONC. FOOTING. GATE TO BE SECURED OPEN BY TWO GATE STOPS SET IN CONCRETE.
6. FENCE SHALL BE DESIGNED TO WITHSTAND 130 MPH WIND LOAD.
7. LATCH HARDWARE SHALL BE AMERISTAR MAXIMA STYLE OR EQUAL.

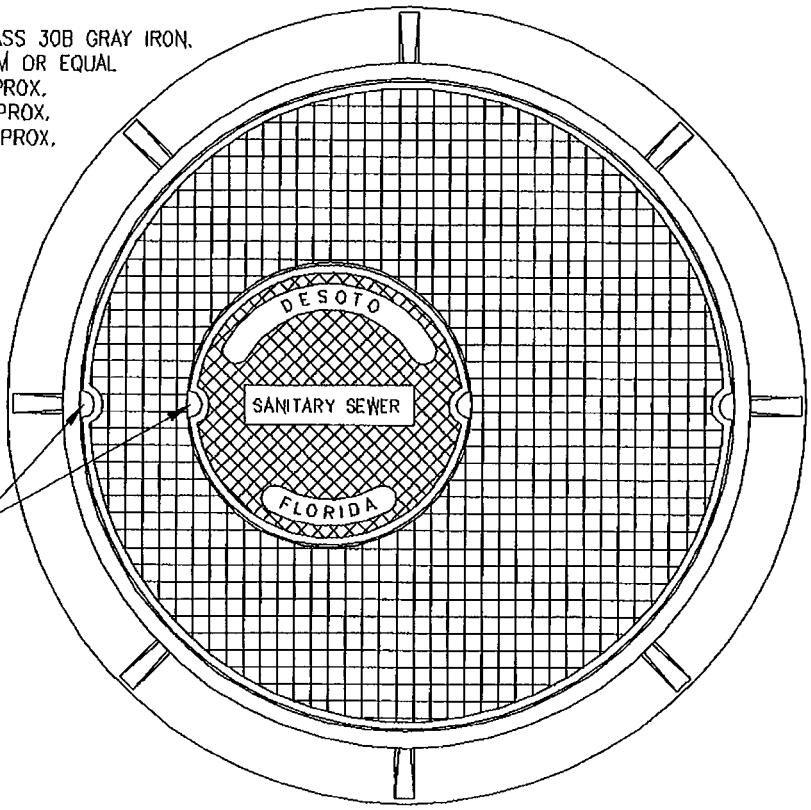
SHADOW BOX WOOD FENCE DETAIL

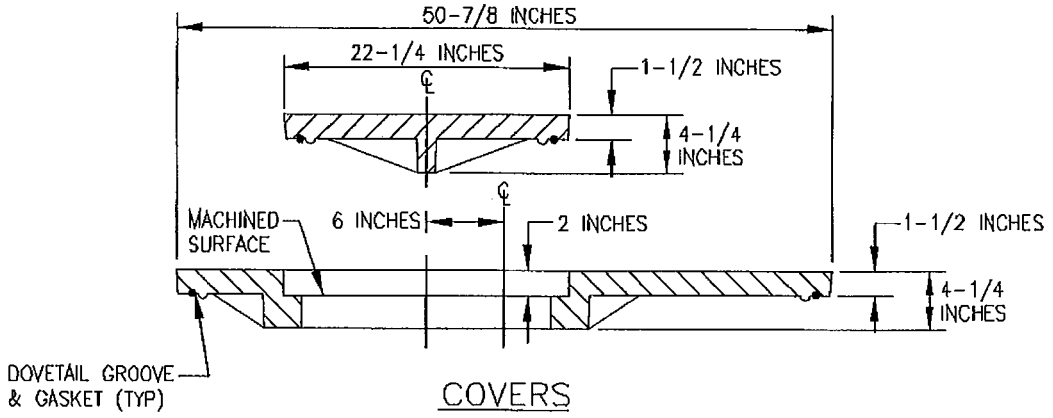
N.T.S.

SHADOWBOX.DWG 07/22/05

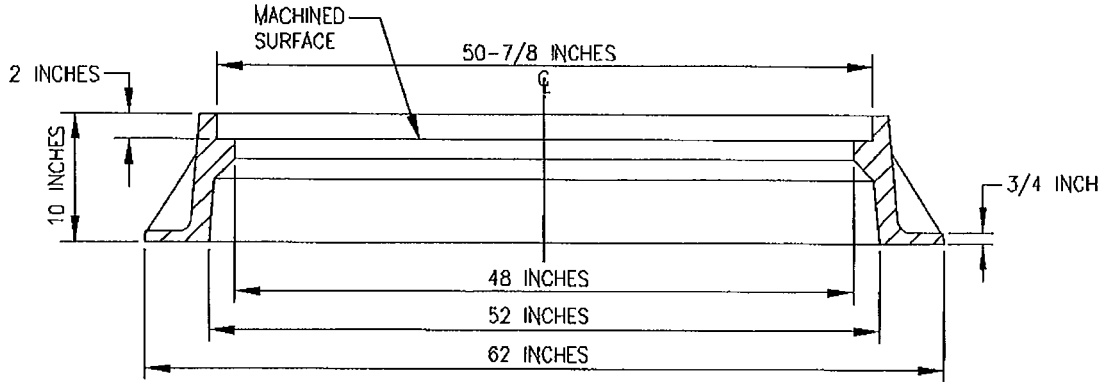
DESOTO COUNTY	SHADOW BOX WOOD FENCE DETAIL N.T.S.	SEWER DWG. NO. 17

NOTES:
1. MATERIAL: ASTM-A48 CLASS 30B GRAY IRON.
2. U.S. FOUNDRY 690-AH-M OR EQUAL
3. INNER WT. 105 LBS. APPROX.
4. OUTER WT. 760 LBS. APPROX.
5. TOTAL WT. 1565 LBS. APPROX.





COVERS



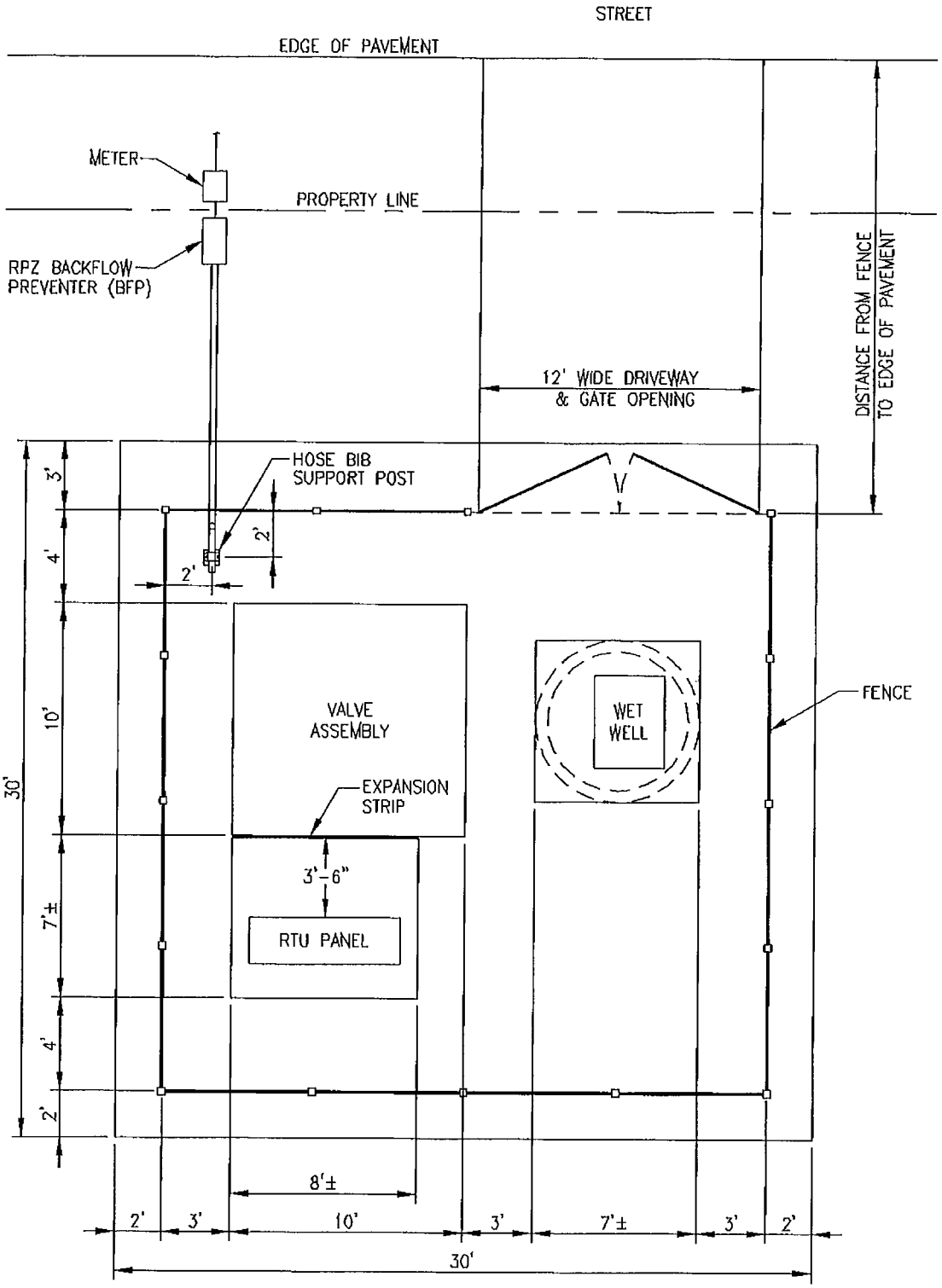
FRAME

LARGE MANHOLE RING & DOUBLE COVER

N.T.S.

DESOTO COUNTY	LARGE MANHOLE RING & DOUBLE COVER N.T.S.	SEWER DWG. NO. 18

MHCOVER2.DWG 04/21/03

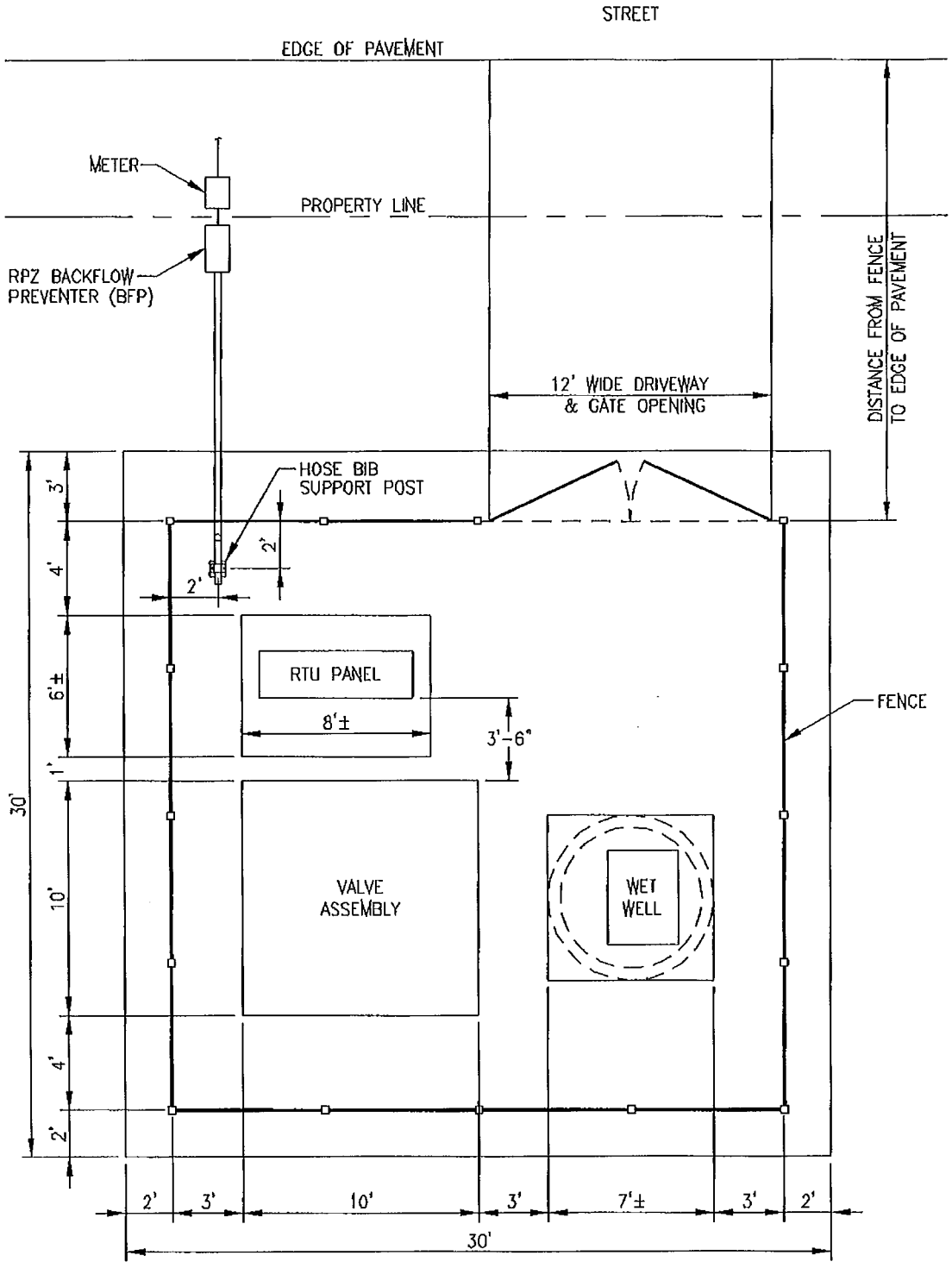


LIFT STATION SITE PLAN

N.T.S.

LSSITEPL.DWG 07/22/05

DESOTO COUNTY	LIFT STATION SITE PLAN N.T.S.	SEWER DWG. NO. 19

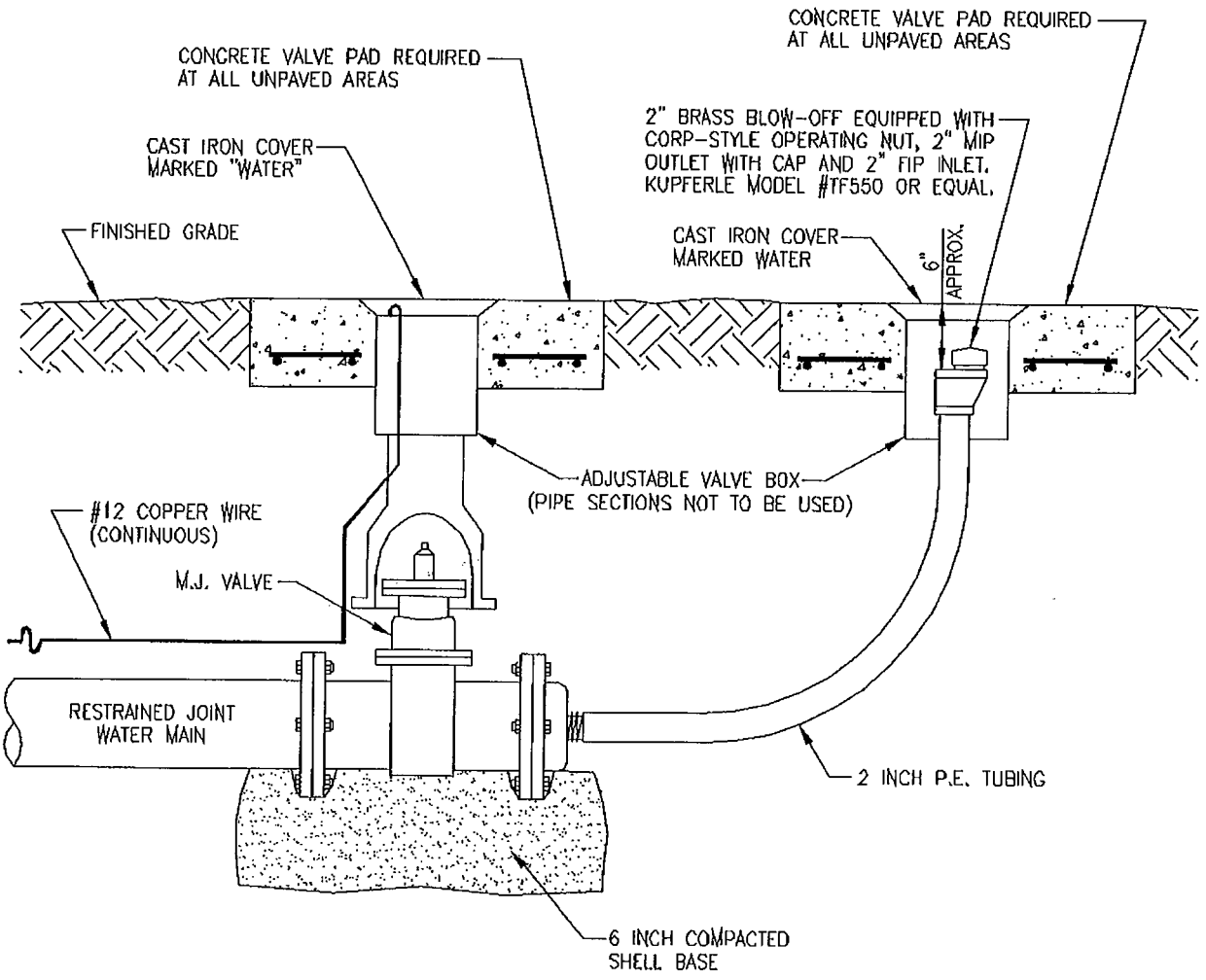


LSSITEZZ.DWG 07/22/05

LIFT STATION SITE PLAN

N.T.S.

DESOTO COUNTY	LIFT STATION SITE PLAN N.T.S.	SEWER DWG. NO. 20



NOTES:

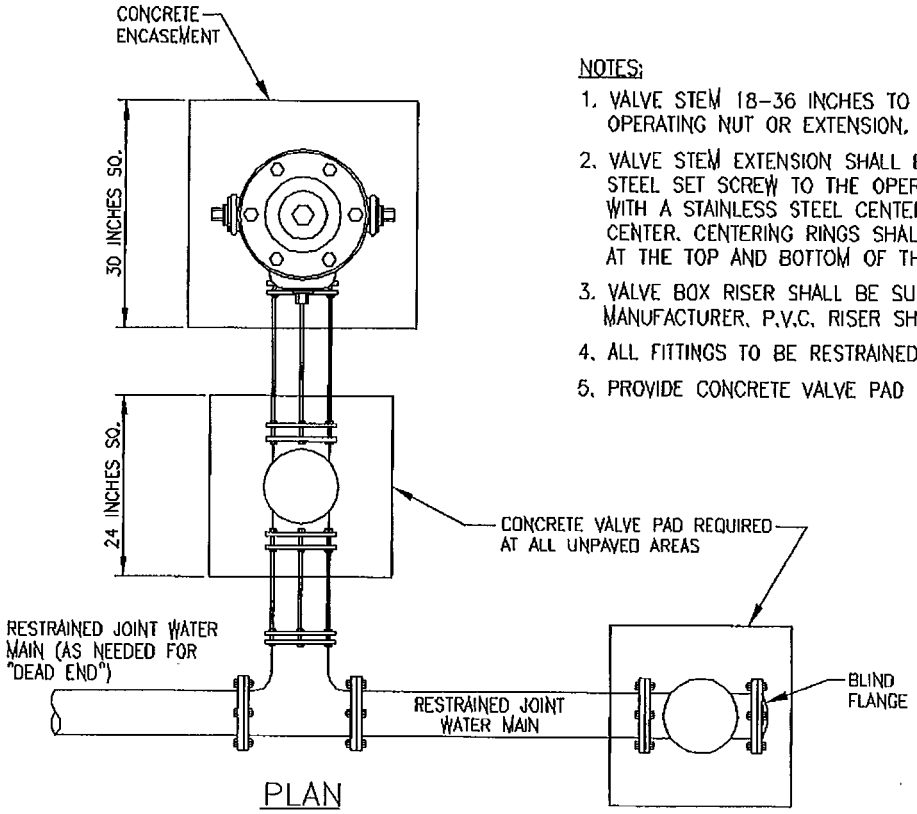
1. VALVE STEM MAXIMUM DEPTH 36 INCHES TO FINISHED GRADE.
2. VALVE STEM EXTENSION SHALL BE SECURED WITH A STAINLESS STEEL SET SCREW TO THE OPERATING NUT, AND SUPPLIED WITH A STAINLESS STEEL CENTERING RING(S).
3. VALVE BOX RISER SHALL BE SUPPLIED BY VALVE BOX MANUFACTURER. P.V.C. RISER SHALL NOT BE ALLOWED.
4. ALL FITTINGS TO BE RESTRAINED JOINT.

2" BLOW-OFF FOR 12" WATER MAIN AND SMALLER

N.T.S.

2BO_GV.DWG 07/22/05

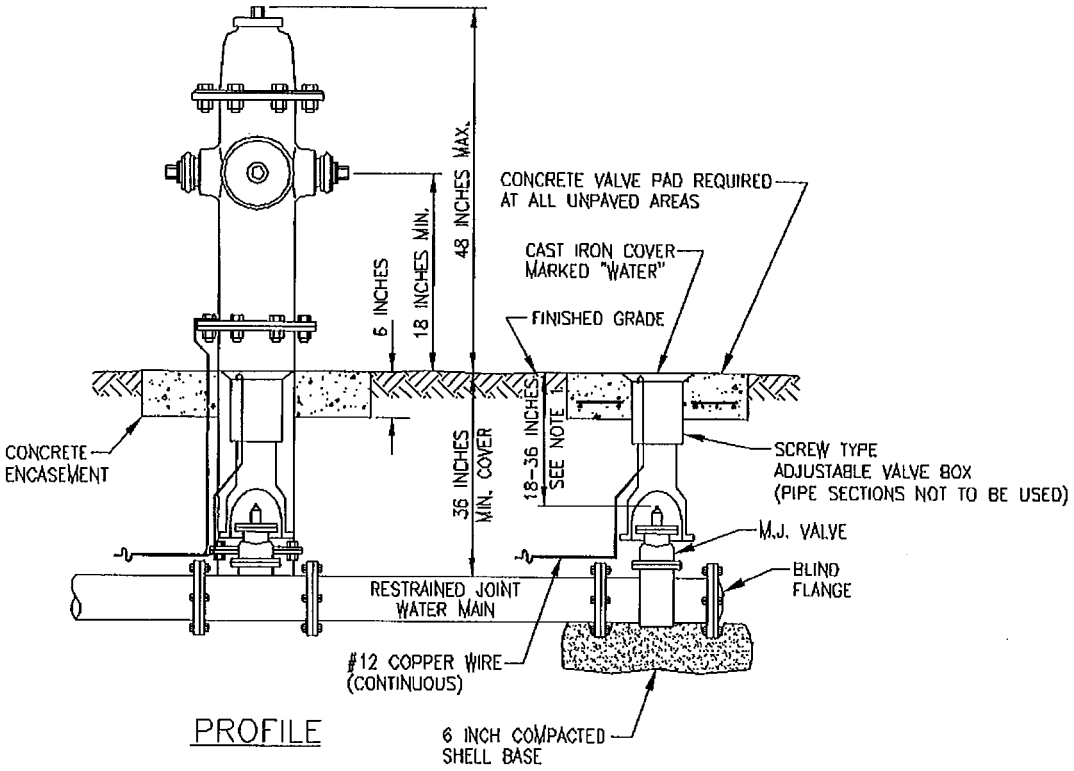
DESOTO COUNTY	2" BLOW-OFF FOR 12" WATER MAIN AND SMALLER N.T.S.	WATER DWG. NO. 1



PLAN

NOTES:

1. VALVE STEM 18-36 INCHES TO FINISHED GRADE FROM OPERATING NUT OR EXTENSION.
2. VALVE STEM EXTENSION SHALL BE SECURED WITH A STAINLESS STEEL SET SCREW TO THE OPERATING NUT, AND SUPPLIED WITH A STAINLESS STEEL CENTERING RING(S) 3 FEET ON CENTER. CENTERING RINGS SHALL BE PROVIDED AT THE TOP AND BOTTOM OF THE EXTENSION.
3. VALVE BOX RISER SHALL BE SUPPLIED BY VALVE BOX MANUFACTURER. P.V.C. RISER SHALL NOT BE ALLOWED.
4. ALL FITTINGS TO BE RESTRAINED JOINT.
5. PROVIDE CONCRETE VALVE PAD PER GEN. DWG. NO. 1.



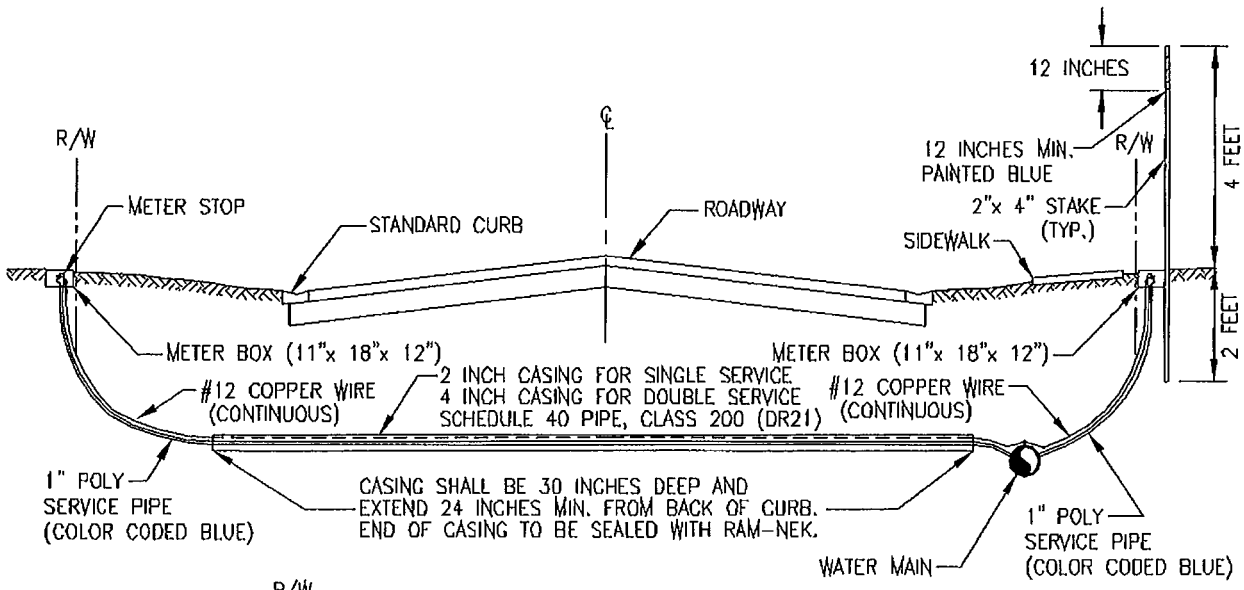
PROFILE

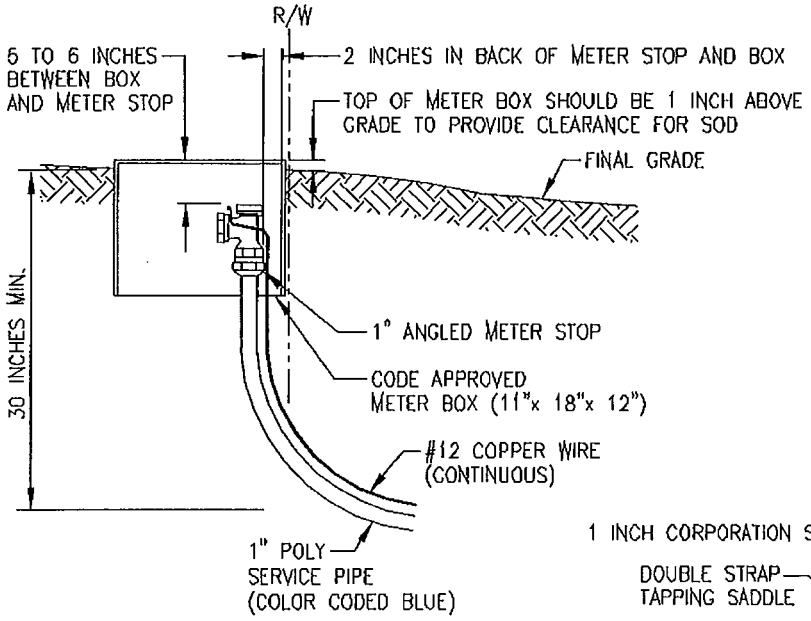
BLOW-OFF FOR 8" AND LARGER WATER MAIN

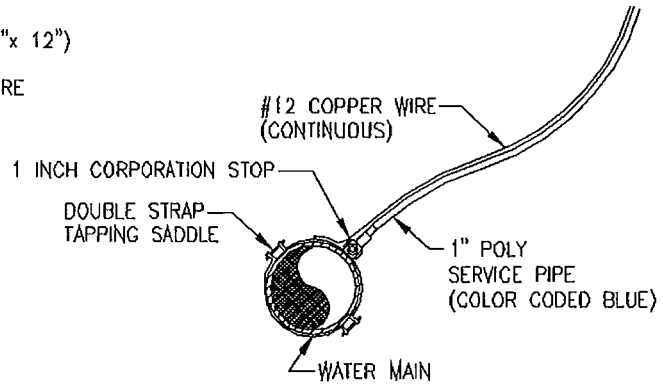
N.T.S.

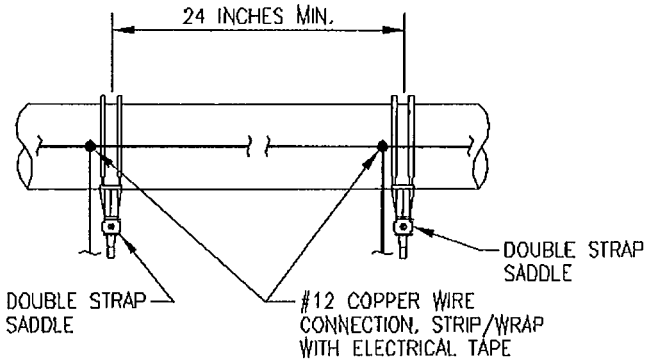
B08-LGWM.DWG 07/22/05

DESOTO COUNTY	BLOW-OFF FOR 8" AND LARGER WATER MAIN N.T.S.	WATER DWG. NO. 1A









NOTES:

1. #12 COPPER WIRE SHALL BE INSTALLED WITH EACH SERVICE.
2. THE METER BOX AND METER STOP SHALL BE INSTALLED SO THE METER REGISTER IS CENTERED ON THE ACCESS HATCH AND PARALLEL TO THE METER BOX.

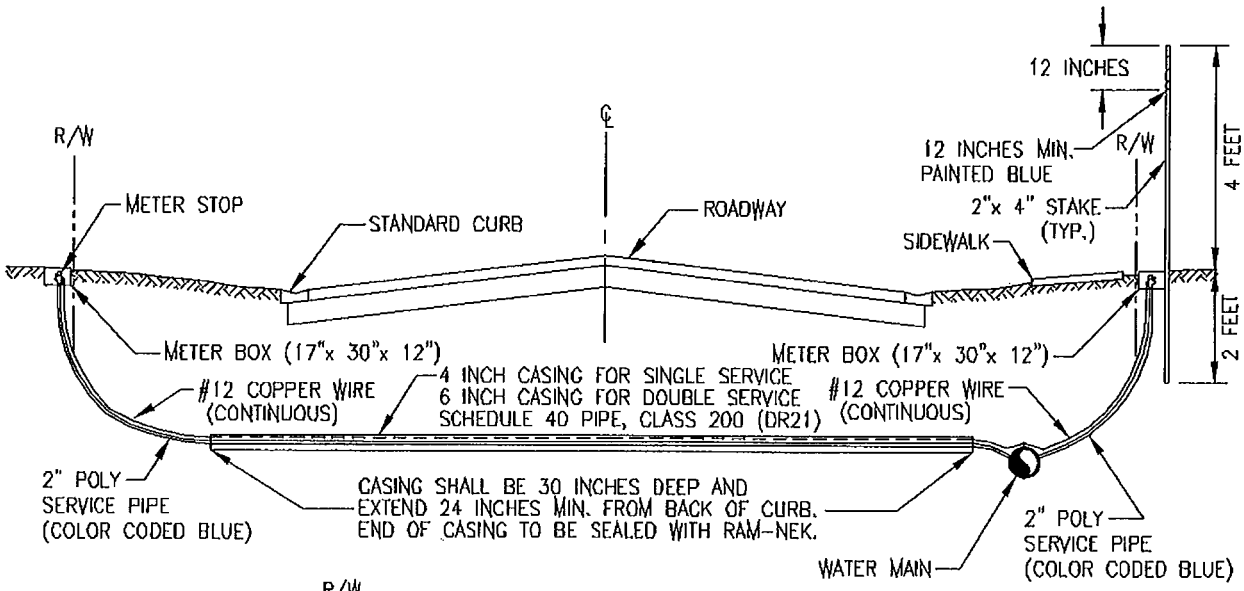
TYPICAL SERVICE CONNECTION

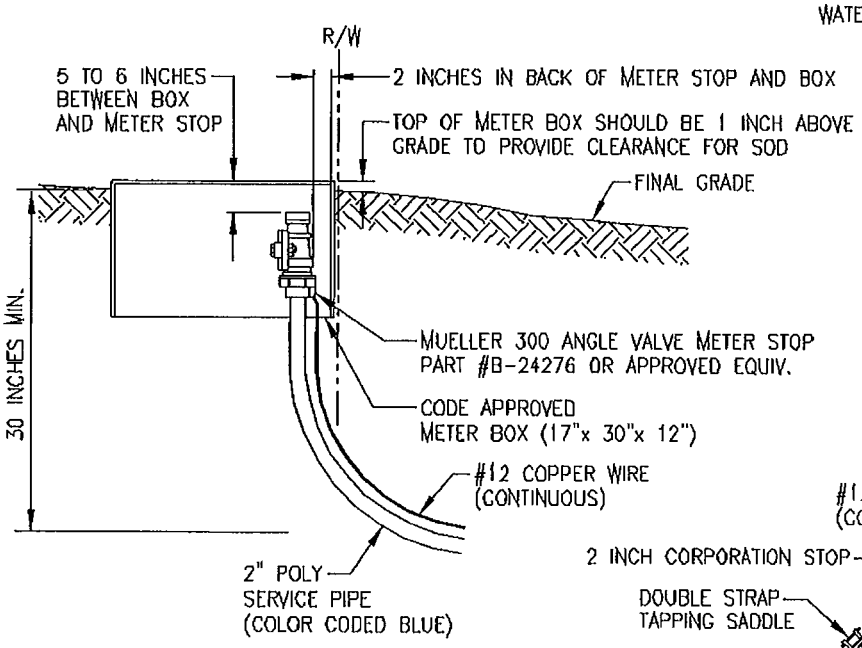
(5/8"x 3/4" METER or 1" METER)

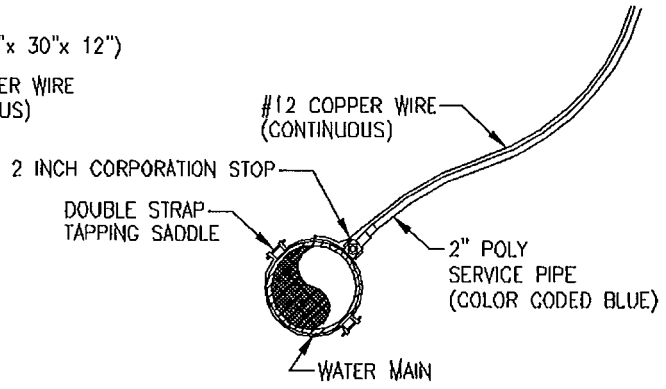
N.T.S.

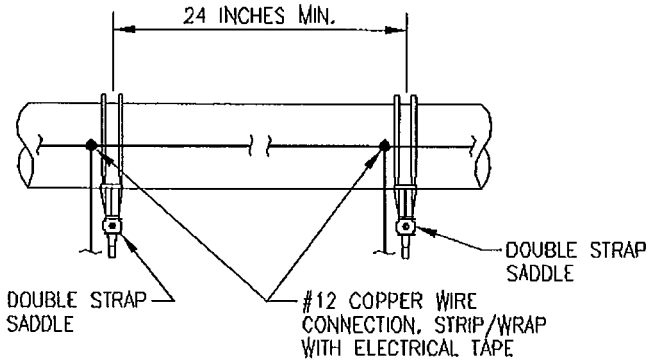
SERVICE.DWG 07/22/05

DESOTO COUNTY	TYPICAL SERVICE CONNECTION N.T.S.	WATER DWG. NO. 2









NOTES:

1. #12 COPPER WIRE SHALL BE INSTALLED WITH EACH SERVICE.
2. THE METER BOX AND METER STOP SHALL BE INSTALLED SO THE METER REGISTER IS CENTERED ON THE ACCESS HATCH AND PARALLEL TO THE METER BOX.

TYPICAL SERVICE CONNECTION

(1" METER OR 1-1/2' METER WHERE GRANDFATHERED IN THE SYSTEM)

N.T.S.

SERVICEA.DWG 07/22/05

DESOTO COUNTY	TYPICAL SERVICE CONNECTION N.T.S.	WATER DWG. NO. 2A

NOTES:
THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL, HIS METHOD OF RESTRAINING THE VALVE OR HYDRANT PRIOR TO ORDERING MATERIAL.

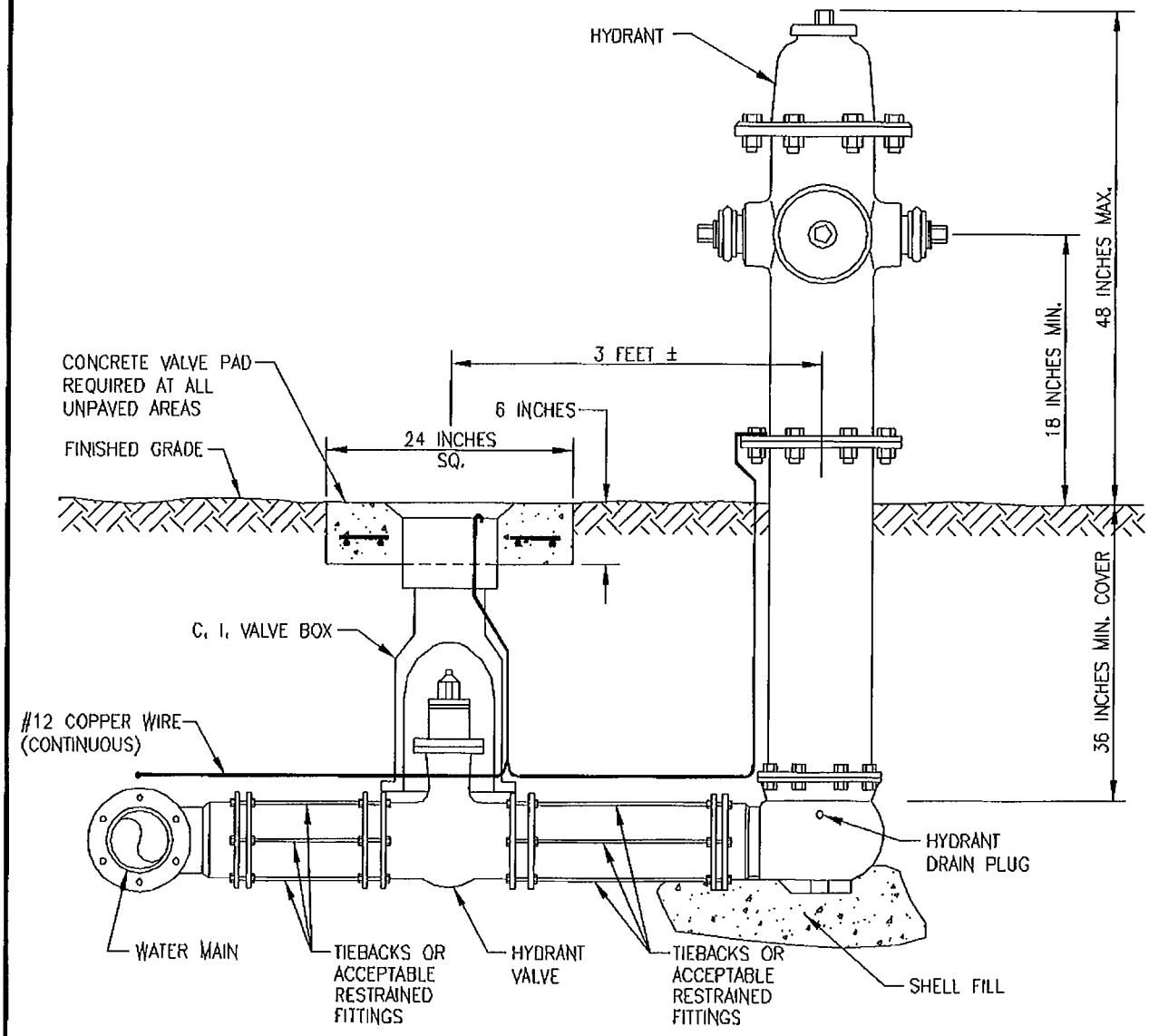
DRAIN HOLES SHALL BE PLUGGED.

ONLY ONE (1) FIRE HYDRANT ASSEMBLY RISER KIT SHALL BE ALLOWED PER FIRE HYDRANT AND SHALL BE SUPPLIED BY FIRE HYDRANT MANUFACTURER.

BURY LINE AS MARKED ON HYDRANT BY THE MANUFACTURER.

DUCTILE IRON SHALL BE USED ON HYDRANT LEAD.

COLOR = OSHA SAFETY YELLOW (WATER)
PURPLE (RECLAIMED)



TYPICAL FIRE HYDRANT ASSEMBLY

N.T.S.

HYDRANT.DWG 07/22/05

DESOTO COUNTY	TYPICAL FIRE HYDRANT ASSEMBLY N.T.S.	WATER DWG NO. 4

WMINSTAL.DWG 07/22/05

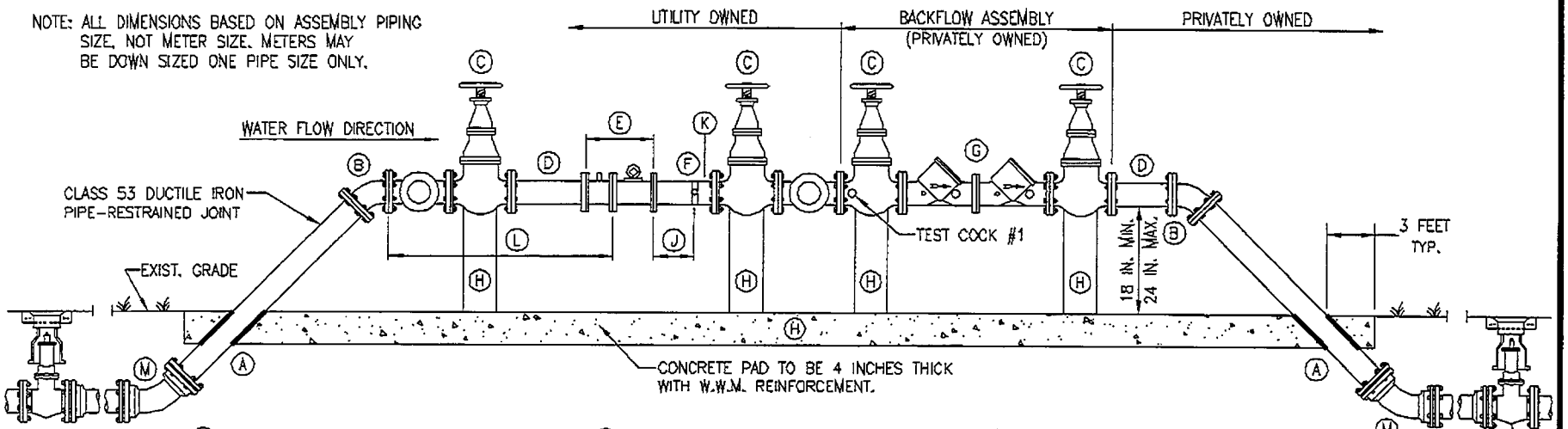
DESOTO COUNTY

WATER METER INSTALLATION GUIDE

N.T.S.

WATER DWG. NO. 5

NOTE: ALL DIMENSIONS BASED ON ASSEMBLY PIPING SIZE, NOT METER SIZE. METERS MAY BE DOWN SIZED ONE PIPE SIZE ONLY.



(A) 1/2 INCH THICK NEOPRENE SLEEVE BETWEEN PIPE AND CONCRETE PAD.

(B) 45° BEND ABOVE GROUND FITTINGS ALL FLANGED.

(C) O. S. & Y. VALVE (RESILIENT WEDGE).

(D) SPOOL PIECE.

(E) STRAINER AND METER (SUPPLIED BY DESOTO COUNTY AT DEVELOPER'S EXPENSE)

(F) 2 INCH LOCKABLE CORP. STOP CC THREADS (FACE AWAY FROM BY-PASS)

(G) BACKFLOW PREVENTER ASSEMBLY AS APPROVED BY UNIVERSITY OF SOUTHERN CALIFORNIA.

(H) REINFORCED CONCRETE PAD AND PIPE SUPPORT OR GRINNELL STAINLESS STEEL PIPE SUPPORT SECURED TO CONCRETE PAD.

(J) TEST COCK PLACEMENT DISTANCE FROM UPSTREAM METER FLANGE.

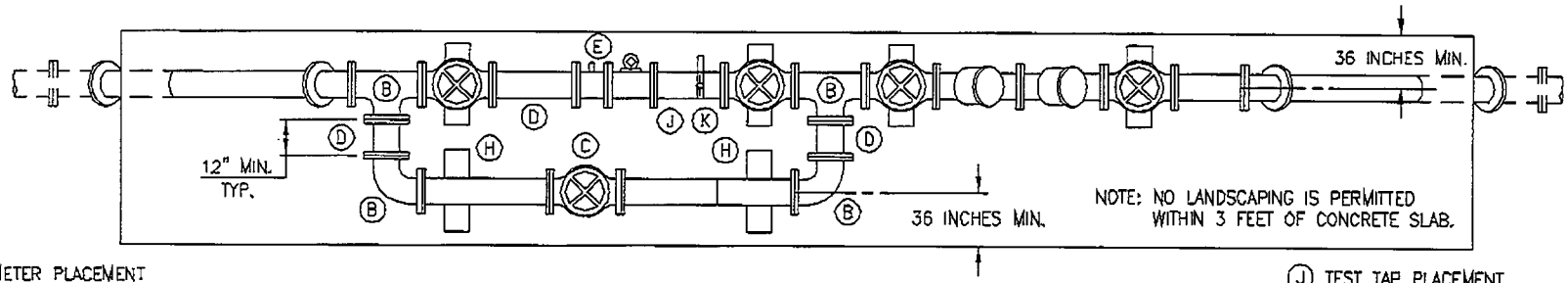
(K) DISTANCE FROM TEST COCK TO DOWN STREAM FLANGE 12 INCHES MINIMUM.

(L) METER PLACEMENT DISTANCE FROM DOWNSTREAM FLANGE OF TOP 45° BEND TO UPSTREAM METER FLANGE.

(M) 45° BEND BELOW GROUND FITTINGS ALL MJ, RESTRAINED JOINT.

PAINT COLOR - OSHA SAFETY BLUE

NO 3 INCH PIPING OR VALVES



(L) METER PLACEMENT
4 INCH ASSEMBLY SIZE = 40 INCH
6 INCH ASSEMBLY SIZE = 60 INCH
8 INCH ASSEMBLY SIZE = 80 INCH
10 INCH ASSEMBLY SIZE =100 INCH

WATER METER INSTALLATION GUIDE

METERS 4" THRU 8" DIAMETER

(SEE WATER DWG. NO. 5A FOR 3" AND 10" DIAMETER METERS)

(J) TEST TAP PLACEMENT
4 INCH ASSEMBLY SIZE = 12 INCH
6 INCH ASSEMBLY SIZE = 18 INCH
8 INCH ASSEMBLY SIZE = 24 INCH
10 INCH ASSEMBLY SIZE = 30 INCH

WMINSTAN.DWG 07/22/05

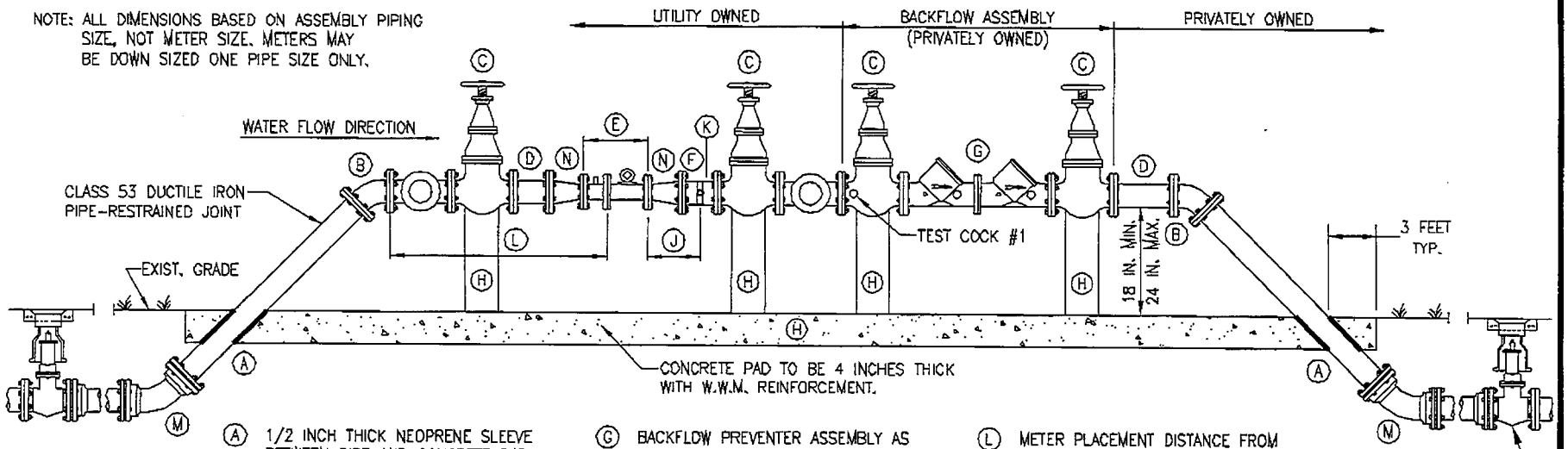
DESOTOA COUNTY

WATER METER INSTALLATION GUIDE

N.T.S.

WATER DWG. NO. 5A

NOTE: ALL DIMENSIONS BASED ON ASSEMBLY PIPING SIZE, NOT METER SIZE. METERS MAY BE DOWN SIZED ONE PIPE SIZE ONLY.



(A) 1/2 INCH THICK NEOPRENE SLEEVE BETWEEN PIPE AND CONCRETE PAD.

(B) 45° BEND ABOVE GROUND FITTINGS ALL FLANGED.

(C) O. S. & Y. VALVE (RESILIENT WEDGE).

(D) SPOOL PIECE.

(E) STRAINER AND METER (SUPPLIED BY DESOTO COUNTY AT DEVELOPER'S EXPENSE)

(F) 2 INCH LOCKABLE CORP. STOP CC THREADS (FACE AWAY FROM BY-PASS)

(G) BACKFLOW PREVENTER ASSEMBLY AS APPROVED BY UNIVERSITY OF SOUTHERN CALIFORNIA.

(H) REINFORCED CONCRETE PAD AND PIPE SUPPORT OR GRINNELL STAINLESS STEEL PIPE SUPPORT SECURED TO CONCRETE PAD.

(J) TEST COCK PLACEMENT DISTANCE FROM UPSTREAM METER FLANGE EXCEPT WHEN USING FLANGED REDUCER START AT DOWNSTREAM END OF FLANGED REDUCER.

(K) DISTANCE FROM TEST COCK TO DOWNSTREAM FLANGE: 12 INCH FOR 3 INCH METER
30 INCH FOR 10 INCH METER

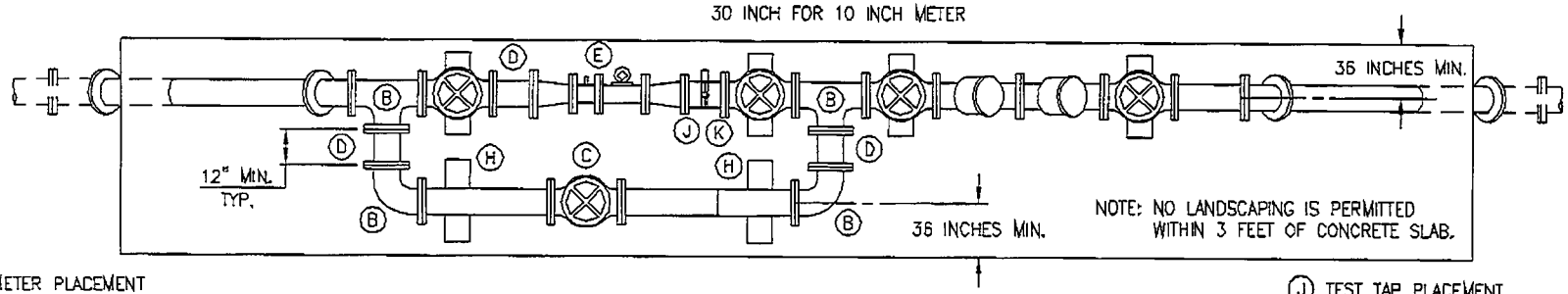
(L) METER PLACEMENT DISTANCE FROM DOWNSTREAM FLANGE OF TOP 45° BEND TO UPSTREAM METER FLANGE.

(M) 45° BEND BELOW GROUND FITTINGS ALL MJ, RESTRAINED JOINT.

(N) 4"x 3" OR 12"x 10" FLANGED REDUCER ONE PIPE DIA. ONLY

PAINT COLOR – OSHA SAFETY BLUE

NO 3 INCH PIPING OR VALVES



(L) METER PLACEMENT
4 INCH ASSEMBLY SIZE = 40 INCH
12 INCH ASSEMBLY SIZE = 120 INCH

(J) TEST TAP PLACEMENT
4 INCH ASSEMBLY SIZE = 12 INCH
12 INCH ASSEMBLY SIZE = 36 INCH

WATER METER INSTALLATION GUIDE

METERS 3" AND 10" DIAMETER

WMINSTAB.DWG 07/22/05

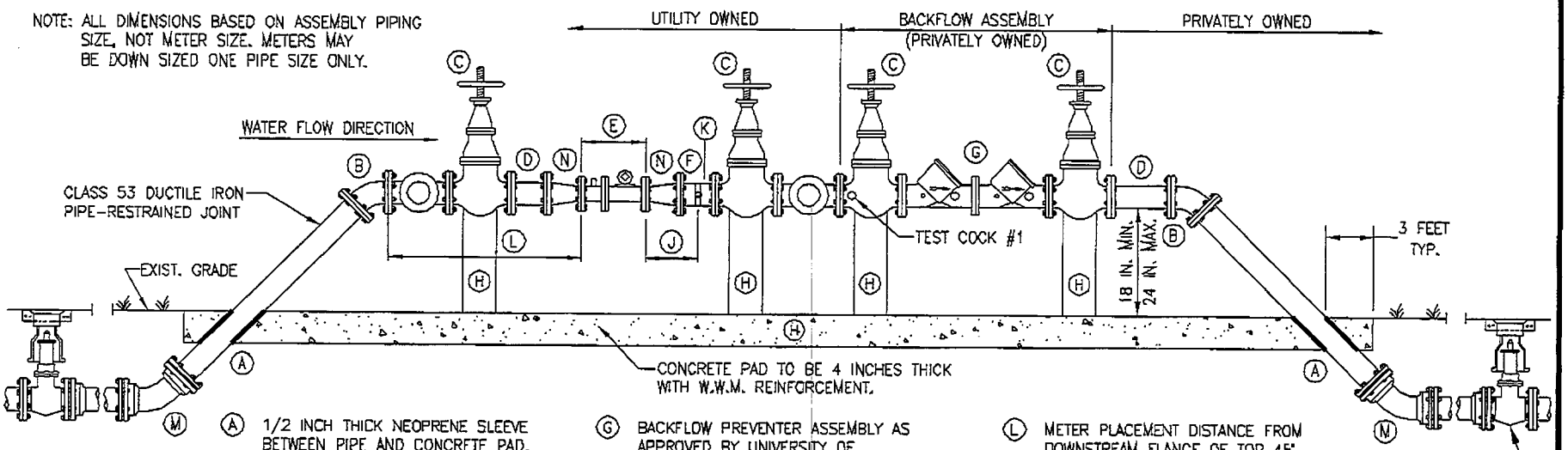
DESOTO COUNTY

WATER METER INSTALLATION GUIDE

N.T.S.

WATER DWG. NO. 5B

NOTE: ALL DIMENSIONS BASED ON ASSEMBLY PIPING SIZE, NOT METER SIZE. METERS MAY BE DOWN SIZED ONE PIPE SIZE ONLY.



(A) 1/2 INCH THICK NEOPRENE SLEEVE BETWEEN PIPE AND CONCRETE PAD.

(B) 45° BEND ABOVE GROUND FITTINGS ALL FLANGED.

(C) O. S. & Y. VALVE (RESILIENT WEDGE).

(D) SPOOL PIECE.

(E) STRAINER AND METER (SUPPLIED BY DESOTO COUNTY AT DEVELOPER'S EXPENSE)

(F) 2 INCH LOCKABLE CORP. STOP CC THREADS (FACE AWAY FROM BY-PASS)

(G) BACKFLOW PREVENTER ASSEMBLY AS APPROVED BY UNIVERSITY OF SOUTHERN CALIFORNIA.

(H) REINFORCED CONCRETE PAD AND PIPE SUPPORT OR GRINNELL STAINLESS STEEL PIPE SUPPORT SECURED TO CONCRETE PAD.

(J) TEST TAP PLACEMENT DISTANCE FROM DOWN STREAM METER FLANGE EXCEPT WHEN USING FLANGED REDUCER START AT DOWNSTREAM END OF FLANGED REDUCER (SEE BELOW).

(K) DISTANCE FROM TEST TAP TO DOWNSTREAM FLANGE 2 PIPE DIAMETER MINIMUM.

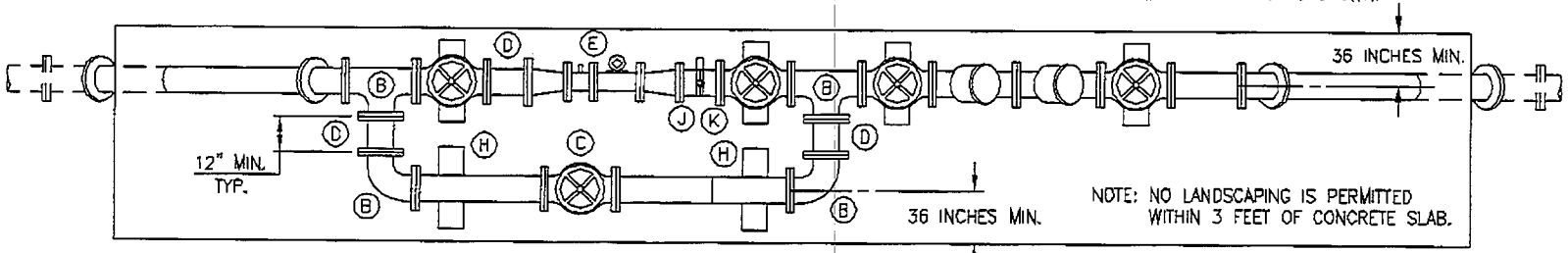
(L) METER PLACEMENT DISTANCE FROM DOWNSTREAM FLANGE OF TOP 45° BEND TO UPSTREAM STRAINER/METER FLANGE (SEE BELOW).

(M) 45° BEND BELOW GROUND FITTINGS ALL MJ. RESTRAINED JOINT.

(N) FLANGED REDUCER ONE PIPE DIA. ONLY WHEN NECESSARY.

PAINT COLOR - OSHA SAFETY BLUE

NO 3 INCH PIPING OR VALVES. FOR 3 INCH METER USE 4 INCH ASSEMBLY SIZE WITH REDUCERS AS SHOWN.



(L) METER PLACEMENT
4 INCH ASSEMBLY SIZE = 40 INCH
6 INCH ASSEMBLY SIZE = 60 INCH
8 INCH ASSEMBLY SIZE = 80 INCH
10 INCH ASSEMBLY SIZE =100 INCH
12 INCH ASSEMBLY SIZE =120 INCH

WATER METER INSTALLATION GUIDE

METERS 3" THRU 12" DIAMETER

(J) TEST TAP PLACEMENT
4 INCH ASSEMBLY SIZE = 12 INCH
6 INCH ASSEMBLY SIZE = 18 INCH
8 INCH ASSEMBLY SIZE = 24 INCH
10 INCH ASSEMBLY SIZE = 30 INCH
12 INCH ASSEMBLY SIZE = 36 INCH

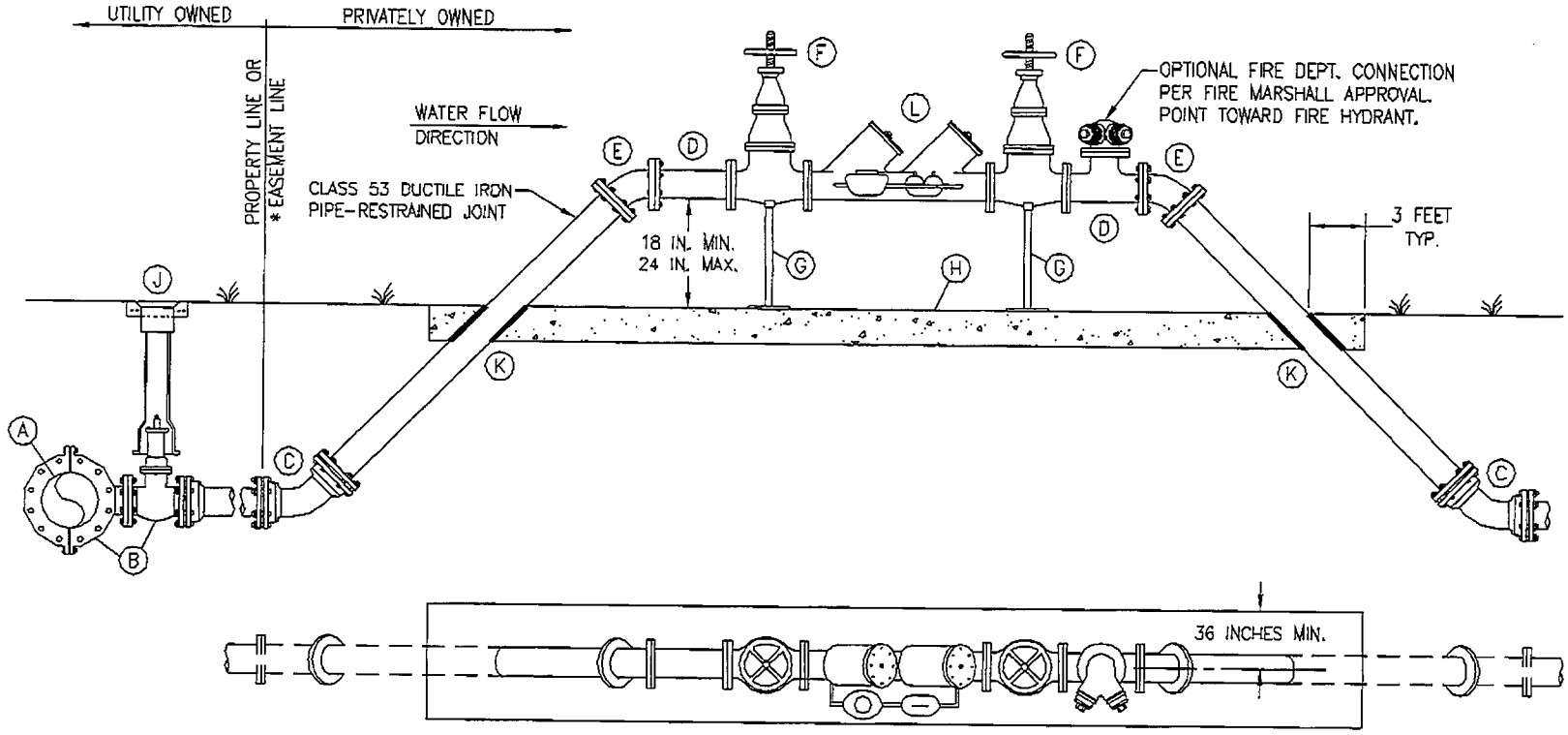
FIREDDCA.DWG 07/22/05

DESOTO COUNTY

FIRE LINE D.D. CHECK ASSEMBLY

N.T.S.

WATER DWG. NO. 6



(A) EXISTING OR PROPOSED WATER MAIN

(B) TAPPING SLEEVE AND VALVE. SEE GEN. DWG. NO. 3

(C) 45° BEND BELOW GROUND FITTINGS ALL MJ. RESTRAINED JOINT

(D) SPOOL PIECE 12 INCH LONG MINIMUM

(E) 45° BEND ABOVE GROUND FITTINGS ALL FLANGED

(F) OS & Y GATE VALVES (FLANGED) MINIMUM 4 INCHES

(G) MINIMUM (2) ADJUSTABLE STAINLESS STEEL PIPE SUPPORTS SECURED TO CONCRETE PAD

(H) CONCRETE PAD TO BE A MINIMUM OF 6 FEET WIDE AND 4 INCHES THICK WITH W.W.M. REINFORCEMENT

(J) VALVE BOX AND COVER.

(K) 1/2 INCH THICK NEOPRENE SLEEVE BETWEEN PIPE AND CONCRETE PAD

(L) DOUBLE DETECTOR CHECK ASSEMBLY AS APPROVED BY UNIVERSITY OF SOUTHERN CALIFORNIA

PAINT COLOR - RED

NO 3 INCH PIPING OR VALVES ALLOWED

*NOTE: EASEMENT LINE MUST BE ADJACENT TO THE ROAD RIGHT-OF-WAY OR APPROVED BY THE UTILITY.

FIRE LINE DOUBLE DETECTOR CHECK ASSEMBLY

4" DIAMETER AND LARGER

N.T.S.

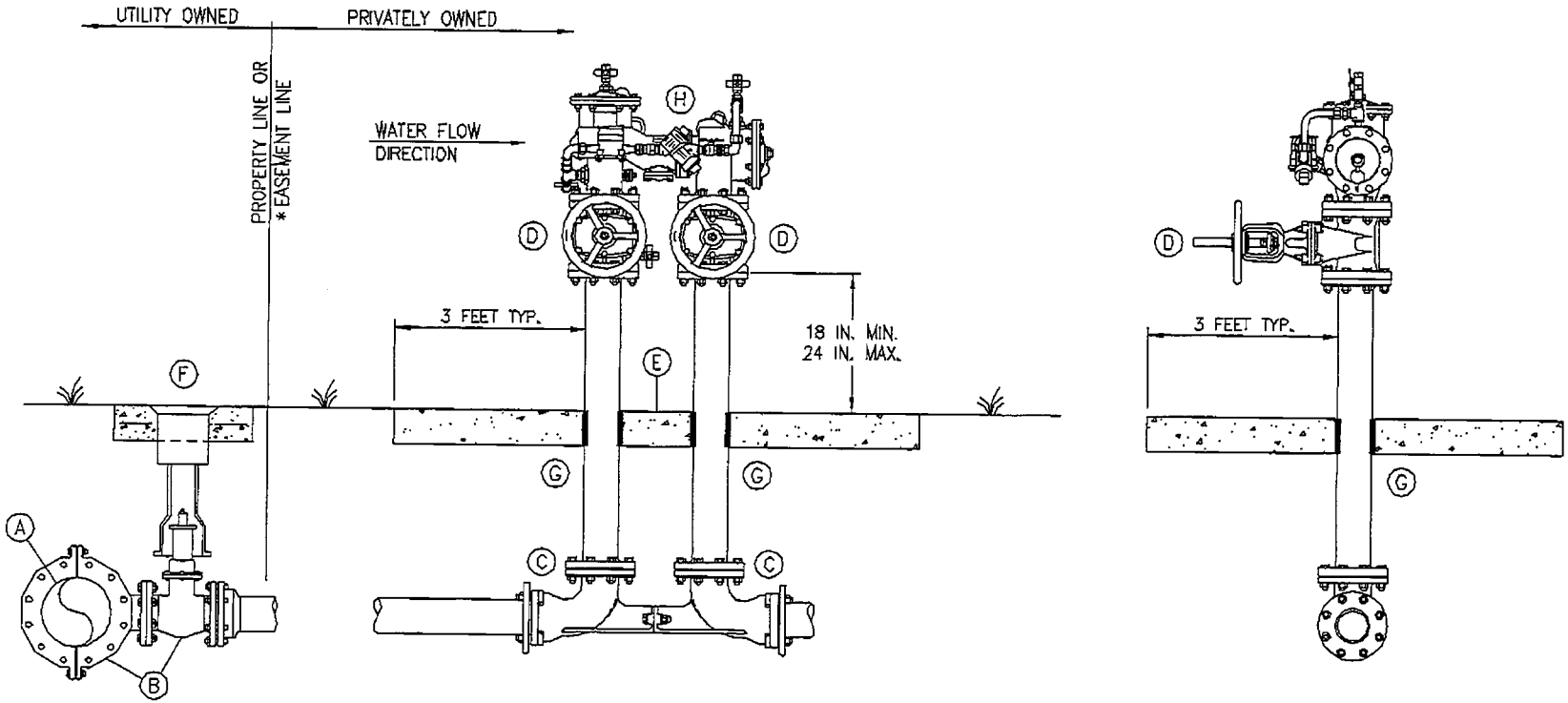
FEBCODCD.DWG 07/22/05

DESOTO COUNTY

FIRE LINE D. CHECK D. ASSEMBLY

N.T.S.

WATER DWG. NO. 6A



(A) EXISTING OR PROPOSED WATER MAIN

(B) TAPPING SLEEVE AND VALVE. SEE GEN. DWG. NO. 3

(C) 90° BEND BELOW GROUND FITTINGS ALL MJ, RESTRAINED JOINT

(D) OS & Y GATE VALVES (FLANGED) MINIMUM 4 INCHES

(E) CONCRETE PAD TO BE A MINIMUM OF 6 FEET WIDE AND 4 INCHES THICK WITH W.W.M. REINFORCEMENT

(F) VALVE BOX AND COVER.

(G) 1/2 INCH THICK NEOPRENE SLEEVE BETWEEN PIPE AND CONCRETE PAD

(H) DOUBLE DETECTOR CHECK ASSEMBLY AS APPROVED BY UNIVERSITY OF SOUTHERN CALIFORNIA

FEBCO MODEL 876V
DOUBLE CHECK DETECTOR ASSEMBLY

PAINT COLOR - RED

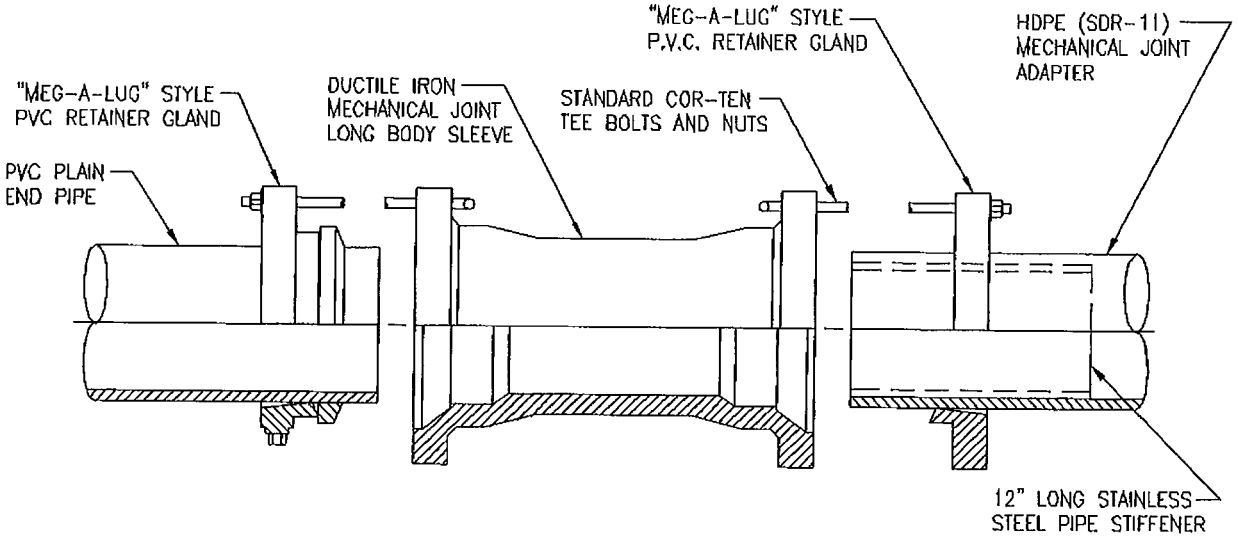
3 INCH PIPING OR VALVES NOT ALLOWED

*NOTE: EASEMENT LINE MUST BE ADJACENT TO THE ROAD RIGHT-OF-WAY OR APPROVED BY THE UTILITY.

FIRE LINE DOUBLE CHECK DETECTOR ASSEMBLY

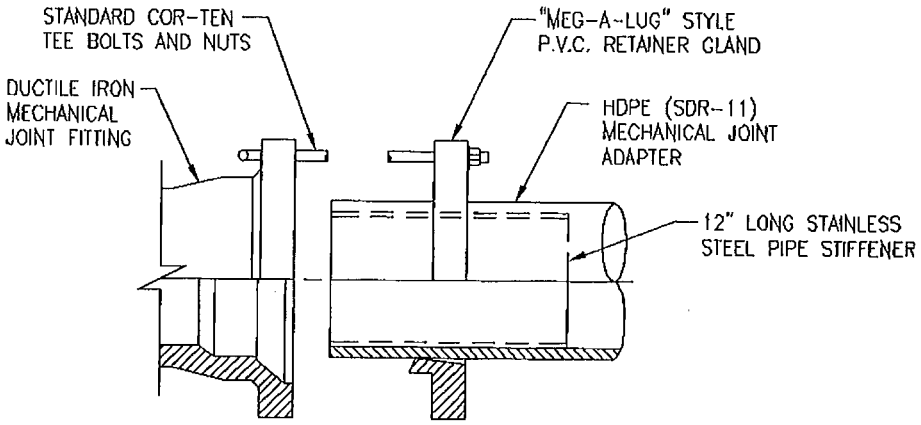
4" DIAMETER AND LARGER

N.T.S.



H.D.P.E. TO P.V.C. TRANSITION DETAIL

N.T.S.



H.D.P.E. TO D.I. FITTING DETAIL

N.T.S.

HDPETRAN.DWG 07/22/05

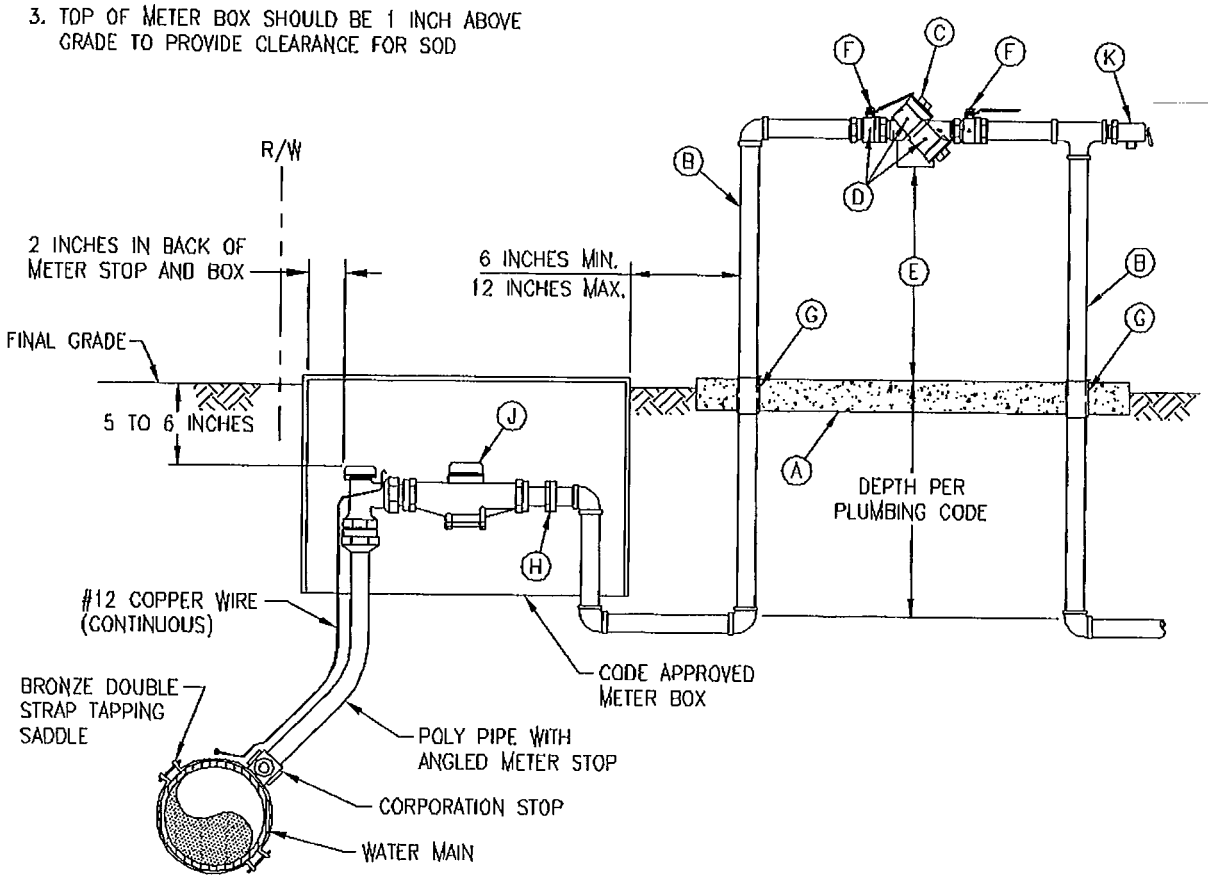
DESOTO COUNTY	H.D.P.E. TRANSITION DETAIL N.T.S.	WATER DWG. NO. 7

MATERIALS

- (A) CONCRETE PAD 4 INCHES THICK AND 3 INCHES BEYOND ALL PIPES (OPTIONAL)
- (B) TYPE "L" OR "K" HARD COPPER OR BRASS/NO GALVANIZED
- (C) APPROVED BACKFLOW PREVENTER BY DEGREE OF HAZARD COMMERCIAL AND LIFT STATIONS TO BE RPZ
- (D) APPROPRIATE TEST COCKS
- (E) 12 INCHES MINIMUM – 18 INCHES MAXIMUM CLEARANCE
- (F) APPROVED RESILIENT SEAT BALL VALVE FOR SIZES LESS THAN 3 INCHES
- (G) SLEEVE AROUND PIPE TO PROTECT IT FROM CONCRETE
- (H) METER SPUD (SUPPLIED BY DESOTO COUNTY)
- (J) METER (SUPPLIED BY DESOTO COUNTY)
- (K) PRESSURE RELEASE VALVE PER PLUMBING CODE

NOTES:

1. ALL RIGID PIPE AND FITTINGS, NO P.V.C. ABOVE GROUND
2. THE METER BOX AND METER STOP SHALL BE INSTALLED SO THE METER REGISTER IS CENTERED ON THE ACCESS HATCH AND PARALLEL TO THE METER BOX.
3. TOP OF METER BOX SHOULD BE 1 INCH ABOVE GRADE TO PROVIDE CLEARANCE FOR SOD



METER WITH BACKFLOW PREVENTER

N.T.S.

DESOTO COUNTY	METER WITH BACKFLOW PREVENTER N.T.S.	WATER DWG. NO. 8

METWBFP.DWG 07/22/05

ITEM TO BE SUPPLIED BY DESOTO COUNTY
(AT DEVELOPER'S EXPENSE)

Ⓐ 2" FLANGED WATER METER
LAYING LENGTH = 17 INCHES
(WITHOUT GASKETS)

ITEMS TO BE SUPPLIED BY CONTRACTOR

Ⓑ 2" METER SPUDS

Ⓒ 2" FLANGED COUPLER ADAPTER KIT

Ⓓ CONCRETE PAD 4" THICK, MINIMUM 44"x 14"
NO REINFORCEMENT WIRE REQUIRED

Ⓔ 2-1/2" MIP x 2" FIP BUSHING

Ⓕ 2"x 2" C x FIP ADAPTER

Ⓖ APPROVED RESILIENT SEAT
LOCKABLE BALL VALVE

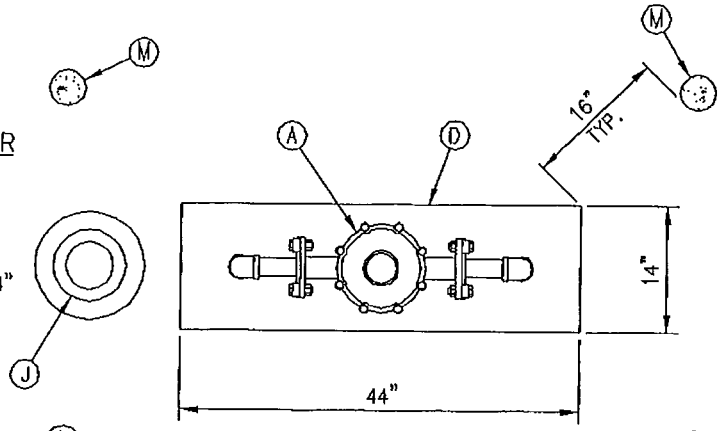
Ⓗ HARD COPPER ASSEMBLY

Ⓙ 6" PHOENIX VALVE BOX (WATER)

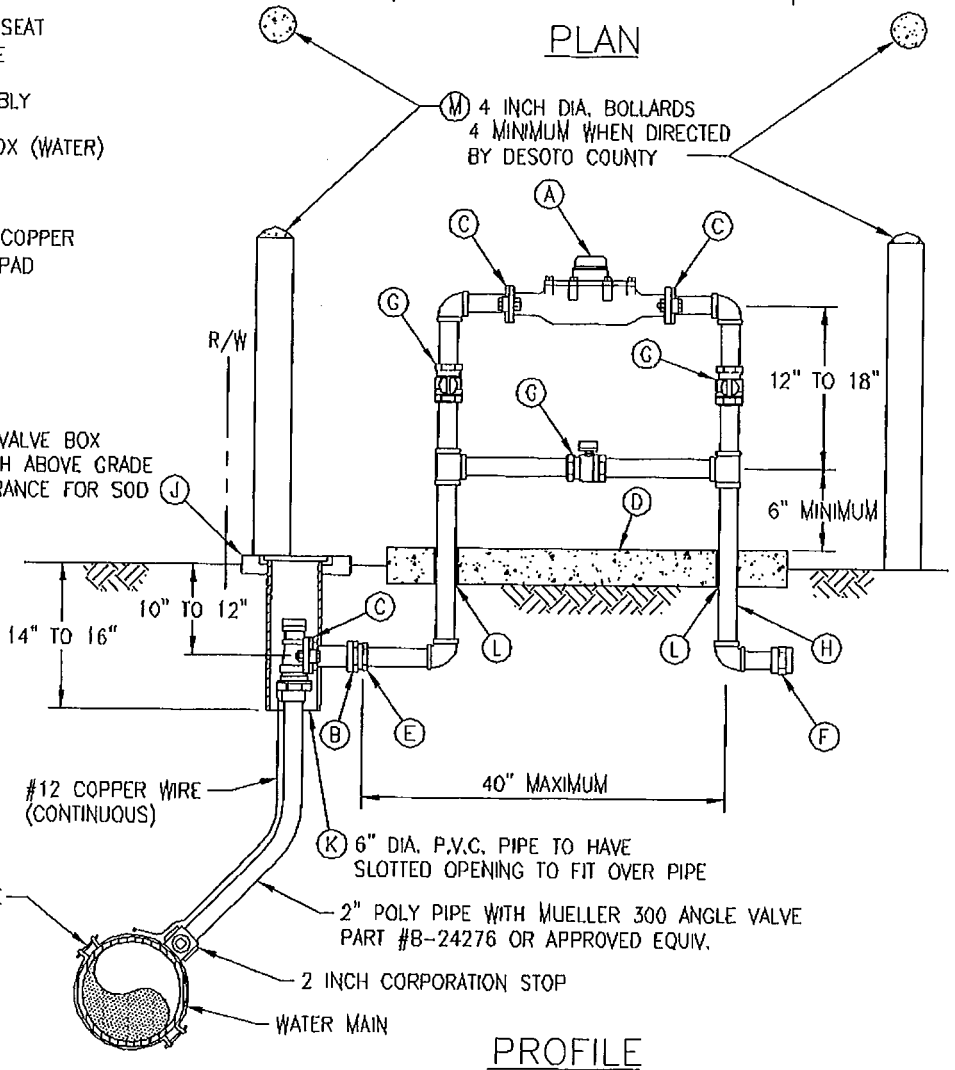
Ⓚ 6" DIA. P.V.C. PIPE

Ⓛ INSULATION BETWEEN COPPER
PIPE AND CONCRETE PAD

Ⓜ 4" DIA. BOLLARDS



PLAN



PROFILE

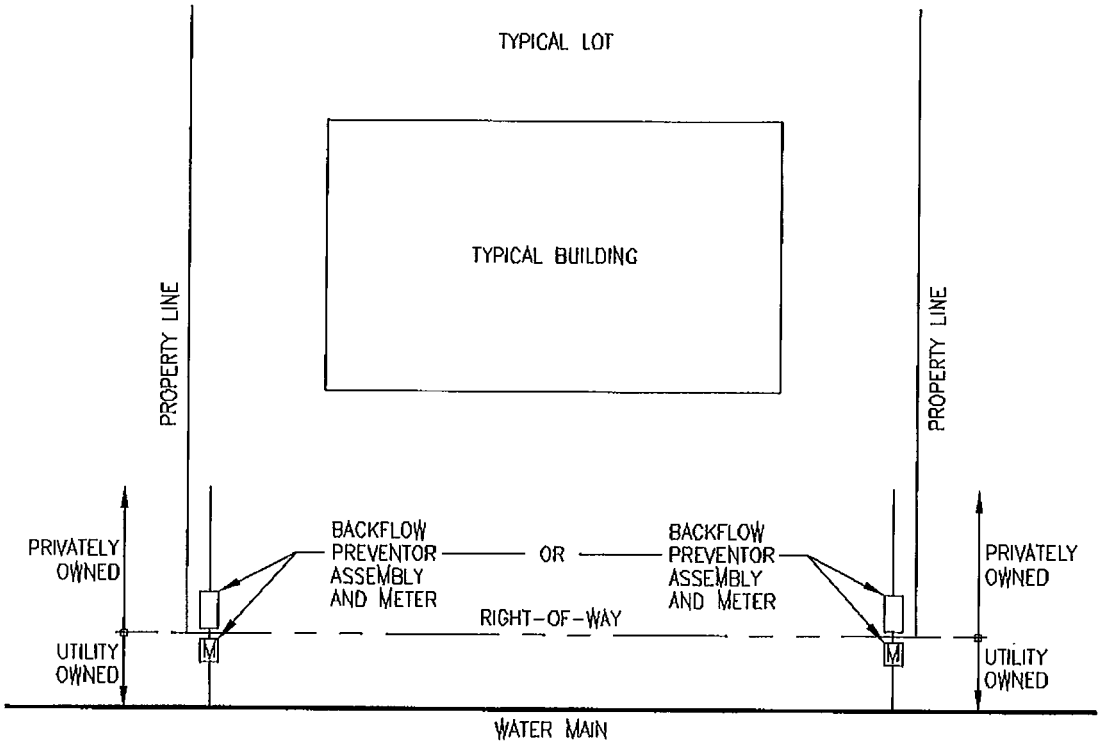
2" COPPER METER ASSEMBLY

(WITH METER COUPLINGS)

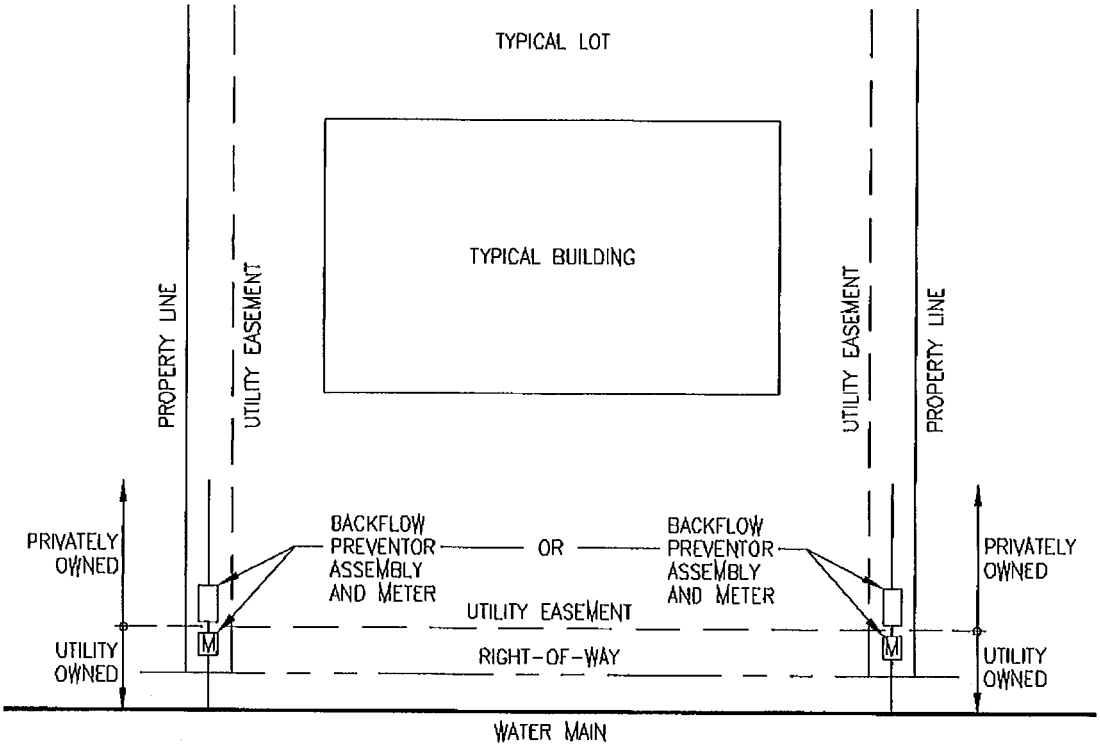
N.T.S.

METER2IN.DWG 07/22/05

DESOTO COUNTY	2" COPPER METER ASSEMBLY N.T.S.	WATER DWG. NO. 9



NO UTILITY EASEMENT



WITH UTILITY EASEMENT

WATER METER INSTALLATION GUIDE

METERS 2" DIAMETER AND SMALLER

WMINSTAZ.DWG 07/22/05

DESOTO COUNTY	WATER METER INSTALLATION GUIDE N.T.S.	WATER DWG. NO. 10

FLORIDA COUNTY ORDINANCE DATA RETRIEVAL SYSTEM - CODRS CODING FORM

Instructions: Florida's Department of State, Bureau of Administrative Code has developed the County Ordinance Data Retrieval System (CODRS) to facilitate the tracking of County ordinances in Florida's 67 Counties. CODRS' data base is composed of over 25,000 county ordinances enacted since 1974.

We request your cooperation in completing this coding form. It is to be completed whenever your county enacts a new ordinance. Simply complete this form and include it with other pertinent ordinance information that is submitted to the Bureau of Administrative Code.

To code this form property, please refer to the "keyfields" description sheet that has been given to your County Attorney's Office. If you do not have this sheet please contact the Bureau. We will be happy to fax one to you for referencing purposes. Please fill out this form as completely as is possible.

Thank you for your assistance. Should you need further assistance please contact the Bureau of Administrative Code, Department of State at (850)-245-6270 or Suncom 205-6270.

COUNTY: (DESOTO) **COUNTY ORDINANCE # (2010-21)**

PRIMARY KEYFIELD DESCRIPTOR: **Water & Sewer**
SECONDARY KEYFIELD DESCRIPTOR:
OTHER KEYFIELD DESCRIPTOR: **ORDINANCE DESCRIPTION:** An Ordinance relating to regulation of water, reclaimed water and wastewater services and utilities in DeSoto County, including a Rate Schedule and adopting the Utilities Standards Handbook.

ORDINANCES AMENDED: (List below the ordinances that are amended by this legislation. If more than two, list the most recent two.)

AMENDMENT #1: **AMENDMENT #2**

ORDINANCES REPEALED: (List below the ordinances that are repealed by this legislation.)

REPEAL #1 **1999-01** **REPEAL #3**

REPEAL #2 **REPEAL #4**

(OTHERS REPEALED: List all that apply:)

(FOR OFFICE USE ONLY): COUNTY CODE NUMBER (____)

KEYFIELD 1 CODE: (_____) KEYFIELD 2 CODE: (_____)

KEYFIELD 3 CODE: (_____) Rev. 4/10/01