CITY OF CORPUS CHRISTI

DEPARTMENT OF PUBLIC UTILITIES

WATER DIVISION

WATER DISTRIBUTION SYSTEM STANDARDS

NOVEMBER 1, 1985

TABLE OF CONTENTS

CITY OF CORPUS CHRISTI

DEPARTMENT OF PUBLIC UTILITIES

WATER DIVISION

Rules, regulations and specifications governing the rehabilitation of and the extensions to the Water Distribution System of the City of Corpus Christi.

I. Definitions

A. Subdivisions

The division of any lot, tract or parcel of land into two or more lots, or sites, as set out in Ordinance No. 4168.

B. City

The City of Corpus Christi, Texas, a municipal corporation, acting by and through its governing body or its City Manager each of whom is required by charter to perform specific duties. Responsibility for final enforcement of contracts involving the City of Corpus Christi is by charter vested in the City Manager.

C. City Attorney

The City Attorney of the City of Corpus Christi, Texas, or his duly authorized assistants or agents.

D. City Council

The Council of the City of Corpus Christi, Texas.

E. City Manager

The Manager of the City of Corpus Christi, Texas.

F. Director of Public Utilities

The Director of Public Utilities of the City of Corpus Christi, Texas, or his duly authorized assistants, agents, engineers or inspectors, acting within the scope of the particular duties entrusted to them.

G. City Engineer

The City Engineer of the City of Corpus Christi, Texas, or his duly authorized assistants, agents, engineers or inspectors, acting within the scope of the particular duties entrusted to them.

H. Superintendent of the Water Division/Water Superintendent

The Superintendent of the Water Division/Water Superintendent of the City of Corpus Christi, Texas, or his duly authorized assistants, engineers, or inspectors, acting within the scope of the particular duties entrusted to them.

I. Specifications

The directions, provisions and requirements contained herein and pertaining to the method and manner of performing the work or or to the qualities or quantities of the material to be furnished.

J. "Shall" and "May"

As used herein, the word "shall" is mandatory, the word "may" is permissive.

K. Subdivider and/or Developer

The terms, "subdivider" and "developer", are synonymous and used interchangeably, and shall include any person, partnership, firm, association, corporation, and/or any officer, agent, employee, servant and trustee thereof who does, or participates in the doing, of any act toward the subdivision of land within the intent, scope and preview of Ordinance No. 4168, as amended, on file in the office of the City Secretary of the City of Corpus Christi.

L. Principal Mercantile and Industrial Areas

Principal mercantile and industrial areas shall be defined to include all uses, except detached single-family, two-family and multi-family residential, that are permitted in those districts that are classified under the Zoning Ordinance of the City of Corpus Christi as follows:

"A-2"	Apartment House District
"A-3"	Apartment-Tourist District
"B-1A"	Tourist Court District
"B-1"	Neighborhood Business District
"B-2"	Bayfront Business District District
"B-3"	Business District
"B-4"	General Business District
"B-5"	Primary Business District
"B-6"	Primary Business Core District
"I-1"	Limited Industrial District
"I-2"	Light Industrial District
"I-3"	Heavy Industrial District

Principal mercantile and industrial areas shall be construed to include but shall not be limited to the following uses: Manufacturing, petrochemical refining, warehousing, port facilities, and residential, business and commercial structures over three (3) stories in height, and any other areas as may be designated by the City Council.

M. Light Mercantile Areas

Light mercantile areas shall be defined to include all uses, other than detached single-family residential and two-family residential, that are permitted in those districts that are classified under the Zoning Ordinance of the City of Corpus Christi as follows:

"R-2"	Multiple Dwelling District
"A-1"	Apartment House District
"A-2"	Apartment House District
"AT"	Apartment-Tourist District
"AB"	Professional Office District
"B-1A"	Tourist Court District
"B-1"	Neighborhood Business District
"B-2"	Bayfront Business District
"B-3"	Business District
"B-4"	General Business District
"B-5"	Primary Business District
"B-6"	Primary Business Core District

Light mercantile shall be construed to include but shall not be limited to shopping centers, individual business locations, apartments, townhouses, condominiums, multi-family structures, and all other business or commercial structures of three (3) stories or less in height, and all other such areas as may be designated by the City Council.

N. Residential Areas

Residential areas shall be defined as to include all uses that are permitted in those districts that are classified under the Zoning Ordinance of the City of Corpus Christi as follows:

"FR"	Farm-Rural District
"R-E"	Residential Estate District
"R-1A"	One-family Dwelling District
"R-1B"	One-family Dwelling District
"R-1C"	One-family Dwelling District
"T-1A"	Travel Trailer Park District
"T-1B"	Mobile Home Park District
"T-1C"	Mobile Home Subdivision District

O. Mains

The word main shall be used as a collective term to include the pipe fitting, valves, fire hydrants, and other appurtenances required for a Water Distribution System.

P. Fire Line

Fire line is a term used to defined a water main that is privately owned, not maintained by the City of Corpus Christi and which is used to provide water to private fire hydrants, hose cabinets and/or fire sprinkler systems. A fire line shall be connected to the City of Corpus Christi Water Distribution System by means of a fire line detector check valve assembly or as requested by the Water Superintendent.

II. SCOPE

The following are general conditions and specifications relative to the design and construction of water mains to be built within the City limits or within the extraterritorial jurisdiction of the City of Corpus Christi and shall govern in the planning and installation of such work; providing that these specifications and/or amendments thereto shall not limit the City's right to change all or part of the rules, regulations and specifications set out herein; providing that all water mains are to be located in dedicated streets or utility easements; providing that after completion and acceptance by the City of Corpus Christi, these mains shall be the sole property of the City and subject to its control and management.

III. PROVISIONS AND REQUIREMENTS

A. Design

The design, location, material and standards of construction of all water distribution systems shall be those which have been adopted, are used for the area and class of service to be adopted. These shall be used by the Water Division for the area or class of service to be provided as specified herein.

B. Capacity

The design of an extension shall be based upon consideration of adequate capacity to meet the present and future requirements of the area to be benefited, of distribution system operation and efficiency, of maintenance requirements and of anticipated life of such extensions as determined by the Superintendent of the Water Division.

C. Origin of Extensions

Required extensions or enlargements of water mains to a subdivision shall be of adequate size and shall originate at a point, or points, as determined by the Superintendent of the Water Division, of the nearest adequate and existing water main, or mains, consistent with good distribution efficiency and operation. No water main extension shall be connected to the system if the cost to the City is so great that in the opinion of the Director of Public Utilities, the expense is not justified on sound business principles.

D. Main Sterilization and Tap Responsibility

To insure the public health, safety and general welfare of the population served by the City of Corpus Christi Water Division, the Water Superintendent shall have Water Division licensed personnel supervise and direct all main sterilization, taps, connections and operations according to the requirements of the Texas State Department of Health, as set out in the Vernon Civil Statutes, Article 4477, Section 11-A. No new piping shall be accepted as part of the distribution system prior to the time that the new system can be sterilized and has been accepted by the City Engineer.

E. Water Line Location

All City of Corpus Christi water lines shall be located in utility easements or dedicated street rights-of-way. Locations of mains in relation to sanitary sewer mains shall be in accordance with the requirements set forth in the "Rules and Regulations for Public Water Systems" as promulgated by the Texas Department of Health, Water Hygiene Division, Latest Edition.

F. Variances

The Water Division shall not be required to install any main or appurtenances at any point in the distribution system, inside or outside the corporate limits of the City of Corpus Christi, if the cost to the City is so great that the expense is not justified on sound business principles. In such cases, mains and appurtenances may be installed under special contracts authorized by the City or City Manager.

G. Areas Claimed by Others

When a proposed subdivision location or potential consumer location is within an area served by a utility independent of the City, such as a water control and improvement district, the subdivider and/or the developer shall furnish the City, before submission of the plat, a written statement from the authorized official of such utility to the effect that the utility can or cannot serve the consumer in accordance with the requirements of this standard.

IV. DESIGN SPECIFICATIONS

The water distribution system design shall include the minimum requirements of the Texas State Board of Insurance and the Rules and Regulations for Public Water Systems as promulgated by the Texas Department of Health in addition to the requirements for peak hour customer demand, as determined by the Water Superintendent.

A. Mains

1. Supply Mains

Supply mains in the distribution system shall be looped and have a minimum size of twelve (12") inches nominal size and shall not exceed 6,000 feet in length between cross connecting mains.

2. Distribution Mains

(a) Mercantile (Principal and Light) and Industrial Mains

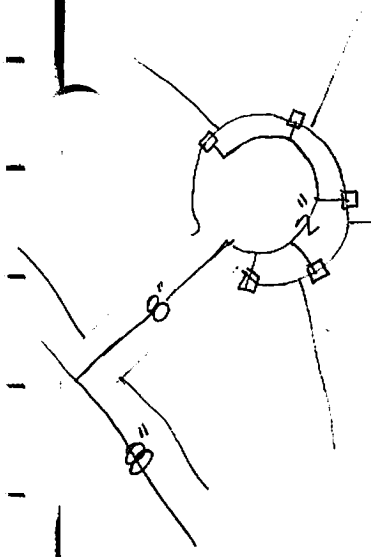
Mains in all mercantile areas shall be looped between supply mains and shall have a minimum size of eight (8") inches nominal size and shall be the shortest of the two following lengths: 3,000 feet or a length that would by fluid friction render the line incapable of producing flows and pressures set out herein for the type of area to be served and with pressures and flows that exist at the supply main's connections as determined by the Water Superintendent.

(1) Mains in principal mercantile and industrial areas shall be installed in dedicated streets and sized so that the minimum fire flow from any single fire hydrant will be not less than 3,000 gallons per minute with 20 psi residual pressure.

(2) Mains in light mercantile areas shall be located in streets or fire lanes and shall be sized so that the minimum fire flow from any single hydrant will be not less than 1,500 gpm with 20 psi residual pressure.

(b) Residential Mains

Mains in residential areas shall be looped between mains of eight(8") inches or larger nominal size and shall have a minimum size of six (6") inches nominal size and shall be the shortest of the two following lengths: 3,000 feet, or a length that would by fluid friction render the line incapable of producing the flows and pressures set out herein for the type of area served and with the pressures and flows that exist at the supply main's connections and as determined by the Water Superintendent. Domestic mains shall be installed in dedicated street right-of-way and sized so that the minimum fire flow at any single fire hydrant will be not less than 750 gpm with 20 psi residual pressure and a domestic use of 2 gpm for every lot in the subdivision.



(c) Domestic Lines

Domestic service lines in residential areas shall be looped between mains on through streets and dead-ended in streets terminated with a cul de sac and shall have a minimum size of six (6") inches nominal diameter. Domestic lines shall be located in dedicated streets between curb and sidewalk.

(d). Short Extensions

Short extensions or service lines ending in dead ends shall be two (2") inch type "K" soft copper, provided that the number of taps does not exceed three.

B. Valves

The distribution system shall be equipped with sufficient number of valves and so located that no case of accident, breakage or repair to the water distribution system mains will necessitate shutting from service a length of water main greater than 600 feet.

C. Fire Hydrants

All extensions or additions to the City of Corpus Christi water distribution system within the city limits or within the extraterritorial jurisdiction of the City of Corpus Christi must meet the requirements as set forth in current Key Rate Schedule as promulgated by the Texas State Board of Insurance for the installation of fire hydrants.

Hydrants shall be located so that there will be a standard City fire hydrant every 600 feet as measured along dedicated streets in residential areas, including dedicated easements and fire lanes in mobile home parks and travel trailer parks.

Hydrants shall be located so that there will be a standard City fire hydrant every 300 feet average as measured along dedicated streets in all mercantile and industrial areas.

Fire hydrants within areas containing apartments and apartment houses shall be located in dedicated streets or utility easements and be spaced not more than 300 feet hose lay from any building, each distance to be measured down any standard fire hose laid from the fire hydrant to the building. No structure or foundation shall be constructed within 15' of any portion of a city water main, fire hydrant or appurtenance.

Every building in the city limits and for a distance of five miles thereof shall be within 500 feet of a standard city fire hydrant.

All fire hydrants shall have a six foot clear horizontal radius of 360° around the fire hydrant free from obstructions and shall be located on street corners or side property lines so as to be readily accessible at all times.

Fire hydrants shall not be installed in sidewalks unless no other location is reasonably available. In that event, fire hydrants shall be located so that sidewalks have a minimum of three feet of unobstructed passageway around the hydrant.

D. Fire Line and Fire Line Taps

1. Interior Fire Systems

The need for interior fire protection of buildings to include fire hydrants, sprinkler systems, hose cabinets, and other internal fire fighting systems shall be approved by the Fire Prevention Bureau. Application for a fire line tap shall be accompanied by an affidavit signed by the City of Corpus Christi Fire Marshall or Fire Chief approving the fire prevention system. Application shall be made to the Water Superintendent who shall determine the availability of adequate water.

2. Fire System Tap Charges

When application for a fire system tap is made, the applicant shall pay the tap and water main extension charge. The tap and water main extension charge shall be determined on the basis of cost as determined by the Water Superintendent.

E. Approved Pipe and Fittings

1. Pipe

Pipe six (6") inches nominal size shall be of class 50 cement enamel lined ductile iron or class 200 asbestos cement or class 150 PVC. The following joints are acceptable: Mechanical or push on. Other types of joints shall be used only on approval by the Water Superintendent. Pipe eight(8") inches nominal size and above shall be minimum class 50 cement enamel lined ductile iron, or class 150 asbestos cement pipe or class 150 PVC. The following joints are acceptable: Mechanical or push on. Other types of joints other than those above shall be used only on approval by the Water Superintendent.

Pipe less than four (4") inches shall be type "K" soft copper or as approved by the Water Superintendent.

2. Fittings

Fittings four (4") inches and above shall be mechanical joint cast iron or ductile iron as specified.

Fittings less than four (4") inches shall be bronze equal to those currently in use by the City of Corpus Christi Water Division.

V. CONSTRUCTION SPECIFICATIONS

The following are Water Division general conditions and specifications relative to the design and construction of water mains to be built in the City limits or within the five mile extraterritorial jurisdiction of the City, and shall govern in the Water Division planning and installation of such extensions.

The Water Division construction unit under the supervision of the Water Superintendent and all contractors shall adhere to all regulations, provisions and specifications herein.

W-80 Asbestos Cement Pipe (A.C.P.)

General

All asbestos cement pipe shall conform to A.W.W.A. C-400, Latest Edition. The standard nominal length shall be thirteen (13) feet. Class 150 A.C.P. shall be used for lines with a nominal size of eight (8") inches or larger: Class 200 A.C.P. shall be used for lines with a nominal size of less than eight (8") inches.

Asbestos cement couplings shall be push-on type with synthetic rubber gaskets, conforming to A.S.T.M. D-1869. Gaskets shall contain no natural rubber.

The pipe, couplings, and gaskets shall be approved by the Underwriters Laboratories, Inc. of the American Insurance Association, Factory Mutual and by the National Sanitation Foundation (NSF).

Certification

The manufacturer shall furnish to the Water Division: A copy of the manufacturer's affidavit of compliance with specifications and a certified copy of an analysis of the material in each gasket showing the type of synthetic rubber and that no natural rubber is present. Certification shall accompany each order delivered.

W-81 Ductile Iron Pipe (D.I.P.)

General

All ductile iron pipe shall conform to A.W.W.A. Standards C-104, C-111 and C-151 latest editions. The interior of pipe shall be lined with enameled cement mortar in accordance with A.W.W.A. C-104 latest edition. The exterior of pipe shall have a coating of coal tar enamel of approximately 1 mil thick or as specified in A.W.W.A. C-151. Ductile iron pipe shall be class 50 unless otherwise specified. Joints for pipe shall be mechanical type or push on, unless specified otherwise.

The pipe and gaskets shall be approved by the Underwriters Laboratories, Inc. of the American Insurance Association, Factory Mutual and by the National Sanitation Foundation (NSF).

Certification

The manufacturer shall furnish to the Water Division: A copy of the manufacturer's affidavit of compliance with specifications and a certified copy of an analysis of the material in each gasket showing the type of synthetic rubber and that no natural rubber is present. Certification shall accompany each order delivered.

W-82 Polyvinyl Chloride Pipe (PVC)

General

All polyvinyl chloride pipe shall conform to A.W.W.A. C-900, latest edition. The standard nominal length shall be twenty (20) feet. Class 150, DR 18 shall be used for all PVC pipe. PVC pipe shall be cast iron pipe equivalent o.d.

Coupling of PVC pipe shall be an integral wall-thickened bell end.

The pipe and gaskets shall be approved by the Underwriters Laboratories, Inc. of the American Insurance Association, Factory Mutual and by the National Sanitation Foundation (NSF).

Certification

The manufacturer shall furnish to the Water Division: A copy of the manufacturer's affidavit of compliance with specifications and a certified copy of an analysis of the material in each gasket showing the type of synthetic rubber and that no natural rubber is present. Certification shall accompany each order delivered.

W-83 Fittings

General

All fittings 4" and larger as listed in A.W.W.A specification C-110 and C-153 shall be either cast iron or ductile iron and in accordance with A.W.W.A. specifications C-104, C-110, C-111, and C-153, latest editions. Cast iron fittings shall have a minimum pressure rating of 250 P.S.I. for sizes thru 12" and 150 P.S.I. for 14" and larger sizes. Mechanical joint ends shall be used. All fittings shall be wrapped with polyethylene in accordance with A.W.W.A. specification C-105, latest edition.

The interior of fittings shall be lined with enameled cement-mortar in accordance with A.W.W.A. C-104 latest edition. The exterior of fittings shall have a coating of coal tar enamel of approximately 1 mil thick or as specified in A.W.W.A. C-151.

Certification

The manufacturer shall furnish to the Water Division: A copy of the manufacturer's affidavit of compliance with specifications and a certified copy of an analysis of the material in each gasket showing the type of synthetic rubber and that no natural rubber is present. Certification shall accompany each order delivered.

W-84 Gate Valves, Resilient-Seated Gate Valves and Valve Boxes

A. Gate Valves

All valves shall meet the following requirements. Gate valves shall be of an acceptable manufacture and shall conform to A.W.W.A. Standard Specification C-500, latest revision thereof, except for changes or additions as follows:

1. The gate valves shall be double disc with parallel or tapered seats and non-rising stems.

2. Valve ends shall be flanged or mechanical joint type or a combination of these as indicated or specified. A complete set of joint materials shall be furnished with each valve, except for flanges.

3. Valves 16" and larger shall be furnished for horizontal installation.

4. Stem seals shall be the O-Ring type or stuffing box type on valves through 12". Valves 16" and larger shall be equipped with stuffing boxes.

5. Valves shall open left (counter clockwise). Valves 20" and larger shall have the main valve stem furnished with a combination hand wheel and operating nut.

6. Tapping valves to be used with tapping saddles shall have one end mechanical joint.

7. The minimum number of turns to open as applied to the operating nut for valves through 12" shall be as set out in A.W.W.A. C-500, latest revision thereof, and for valves 16" and larger as follows:

   16 inch - 96 turns to open
   20 inch - 128 turns to open
   24 inch - 152 turns to open
   30 inch - 186 turns to open
   36 inch - 222 turns to open

8. All gears shall be in oil filled, extended type gear cases.

9. Valves shall be furnished without position indicator.

10. Bypass valves shall be installed on valves 20" in diameter and larger.

11. All valves 16 inches in diameter and above shall be equipped with bevel gears.

12. The manufacturer shall upon request furnish the City two (2) certified sets of prints showing complete details and dimensions and materials used. The manufacturer shall also upon request furnish the City a certified letter of compliance stating that their valve meets these specifications. Also, the manufacturer shall upon request furnish the City one (1) certified copy of the physical tests of all metals used in the manufacture of the valve.

B. Resilient-Seated Gate Valves

Resilient-seated gate valves may be used instead of gate valves in sizes 3" thru 12". All valves shall meet the following requirements. Resilient-seated valves shall be of an acceptable manufacture and shall conform to A.W.W.A. Standard Specification C-509, latest edition, except for changes or additions as follows:

1. The resilient-seated gate valves shall have non-rising stems.

2. Valve ends shall be flanged or mechanical joint type or a combination of these as indicated or specified. A complete set of joint materials shall be furnished with each valve, except for flanges.

3. Stem seals shall be the o-ring type or stuffing box type.

4. Valves shall open left (counter clockwise).

tapping sleeves - mech joint - epoxy coating w/ stainless steel bolts except on

5. Tapping valves to be used with tapping saddles shall have one end mechanical joint.

6. The manufacturer shall upon request furnish the City two (2) certified sets of prints showing complete details, dimensions and materials used. The manufacturer shall also upon request furnish the City a certified letter of compliance stating that their valve meets these specifications. Also, the manufacturer shall upon request furnish the City one (1) certified copy of the physical tests of all metals used in the manufacture of the valve.

Cast Iron Valve Boxes

Cast iron valve boxes shall be provided over all operating nuts of gate valves 12" and smaller. The word "water" shall be cast in the top cover. The boxes and lids shall be given a coat of hot tar dip. They shall be equal to standard City of Corpus Christi pattern.

The extension pipe of the valve box shall be either eight (8") A.C.P. or 8" P.V.C. (SDR 35), or 8" smooth exterior wall nonreinforced concrete drain pipe,

Other types of valve boxes with extensions may be used only with the prior approval of the Water Superintendent.

W-85 Fire Hydrants

General

The fire hydrants shall conform to A.W.W.A. C-502, latest revision thereof, except for changes, additions and supplementary details specifically outlined herein:

a) Hydrants shall be of the traffic model type equipped with a safety flange or collar on both the hydrant barrel and stem.

b) Type of Shutoff - The shut off shall be of the compression type only.

c) Inlet Connection - The inlet shall be A.W.W.A. C111 (latest revision thereof) mechanical joint for six (6") inch, class 50 ductile iron pipe. A complete set of joint material shall be furnished with each hydrant.

d) Delivery Classifications - Each hydrant shall have two hose nozzles and one pumper nozzle. Nozzle shall be threaded into the hydrant.

e) Bury Length - The hydrants shall be furnished in the bury length as specified.

f) Diameter (Nominal Inside) of Hose and Pumper Nozzles - The hose nozzles shall be two and one-half (2½") inches inside diameter and the pumper nozzle shall be four (4") inches inside diameter.

g) Hose and Pumper Nozzle Threads - The hose nozzles shall have two and one-half (2½") inch National Standard Thread (7½ threads per inch). The pumper nozzle shall have six (6) threads per inch with an outside diameter of 4.658 inches, pitch diameter of 4.543 inches, and a root diameter of 4.406 inches.

h) Harnessing Lugs - None required.

i) Nozzle Cap Gaskets - Required.

j) Drain Opening - Drain opening is required. Tapping of the drain opening for pipe threads is not required.

k) The Valve Seat Ring - The valve seat ring shall not be made an integral part of the shoe. The valve seat ring shall be bronze and shall thread into a bronze drain ring.

l) Nozzle Cap Chains - Hydrants shall be furnished without nozzle cap chains.

m) Direction to Open - The hydrants shall open left (counter clockwise).

n) Color of Finish Above Ground Line - That portion of the hydrant above the ground line shall be painted chrome yellow.

o) Shape and Size of Operating and Cap Nuts - The operating and cap nuts shall be tapered pentagon one and one-fourth (1¼") inch point to face at base and one and one-eight (1-1/8") inch point to face at top of nut.

p) Size of Fire Hydrant - The main valve opening shall not be less than five and one-fourth (5¼") inches inside diameter.

q) Valve Facing - The main valve facing of the hydrant shall be rubber with 90± one (1) durometer hardness. When the main valve lower washer and stem nut are not an integral casting then the bottom stem threads shall be protected with ductile and/or bronze cap nut and a stainless steel and/or bronze lock nut.

r) Barrel Sections - The hydrant shall be made in two or more barrel sections with flanges connecting the barrel to the elbow and to the packing plate.

s) Breakable Coupling - Hydrants shall be equipped with a breakable coupling on both the barrel section and the stem. The couplings shall be so designed that in case of traffic collision, the barrel and stem collar will break before any other part of the hydrant breaks. These couplings shall be at least two (2) inches above the finished grade line.

t) Hydrant Adjustment - The hydrant shall be designed as to permit its extension without excavating after the hydrant is completely installed.

u) Breakable Collars, Barrel and Stem - Weakened steel or weakened cast iron bolts that are used in the breakable barrel couplings will not be acceptable.

v) Operating Stem - Stems that have operating threads located in the waterway shall be made of manganese bronze, everdure, or other high quality non-corrodible metal. Stems that do not have operating threads located in the waterway must be sealed by a packing gland or "O" ring seal located between the stem threads and the waterway. Iron or steel stems shall be constructed with a bronze sleeve extending through the packing or "O" ring seal area. The sleeve shall be of sufficient length to be in the packing or "O" ring seal in both open and closed positions of the main valve. The sleeve shall be secured to the steel stem so as to prevent water leakage between the two when subjected to 300 pounds hydrostatic test pressure.

w) Drain Valve Mechanism - Drain valves operating through springs or gravity are not acceptable.

x) Operating Stem Nut - The operating stem nut shall be designed to prevent seepage, rain, or sleet and the accumulation of dust between the operating nut and the hydrant top. The operating stem nut shall be made of bronze.

y) Packing Gland or "O" Ring Seal - Fire hydrants having the threaded part of the stem at the hydrant top shall be equipped with a packing gland or an "O" ring seal immediately below the threaded section of the stem.

Certification

The manufacturer shall upon request furnish the City two (2) certified sets of prints showing complete details and dimensions of the hydrant. The manufacturer shall upon request furnish the City one (1) certified copy of the physical tests of all metals used in the manufacture of the fire hydrant that is normally manufactured and that will meet these specifications. The manufacturer shall upon request furnish the City a certified letter of compliance stating that their fire hydrant meets these specifications.

W-86 Installation of Water Pipe, Fittings, Fire Hydrants and Appurtenances

Description

This specification shall govern all work necessary for the installation of all water pipe and appurtenances required to complete the project.

Materials

Asbestos cement pipe: See Part W-80

Ductile iron pipe: See Part W-81

Polyvinyl Chloride Pipe: See Part W-82

Fittings: See Part W-83

Gate valves, resilient gate valves and valve boxes: See Part W-84

Fire Hydrants: See Part W-85

Construction Methods

1. Alignment and Grade

   a) General: All pipes shall be laid and maintained to the required lines and grades. Fittings, valves and hydrants shall be at the required locations and all valve and hydrant stems plumb.

   Temporary support and adequate protection of all underground and surface utility structures encountered in the progress of the work shall be furnished by the contractor.

   Where the grade or alignment of the pipe is obstructed by existing utility structures such as conduits, ducts, pipes, and connections to sewers or drains, the obstruction shall be protected at the contractor's expense, in cooperation with the owners of such utility structures. Costs of adjustment shall be borne by the contractor. All proposed water distribution systems shall start and end at the source or sources of water.

   An approved set of construction drawings shall be maintained on the job site at all times.

   All proposed water distribution systems, unless otherwise approved, shall be installed with an alignment 7 feet off of and parallel to the street r.o.w., or if installed in an easement the water main shall be centered in the easement. No structure or foundation shall be constructed closer than 15 feet to a water main unless approved by the Water Superintendent.

No underground utility shall be installed parallel to the water main in the zone defined by a vertical plane perpendicular to the longitudinal axis of the water main with the boundaries of this zone being as follows:

Horizontal - 18" on each side of main O.D.

Vertical - 18" below pipe O.D. + distance to ground surface

Length - entire main

b) Deviations From Drawings: No deviation from the line and grade shown on plans may be made without the written consent of the Water Superintendent.

c) Depth of Cover: Depth of cover will be measured from the established street grade or the surface of the permanent improvement to the top of the pipe barrel. Unless otherwise shown on drawings, the depth of cover shall be as follows:

Minimum* - 30"

Maximum* - 48"

* Variations to the minimum and maximum depth of cover shall be prominently marked on the water layout portion of the construction plans.

2. Polyethylene Wrapping

All ductile or cast iron pipe, valves, and, fittings, except pipe or valves which are laid in encasement pipe or in concrete valve vaults, shall be wrapped in polyethylene in accordance with A.W.W.A. Specification C-105, latest edition. The polyethylene material shall have a thickness of 8 mils and may be either clear or black. The wrapping shall be lapped in such manner that all surfaces of pipe valves and fittings, including joints, shall have a double thickness of polyethylene. If a single longitudianal lap is made, using a double thickness of polyethylene, it shall be lapped a minimum of 18 inches and the lap shall be placed in the lower quadrant of the pipe and in such a manner that backfill material cannot fall into the lap. The polyethylene shall be secured in place with binder twine at not more than six foot intervals. If wrapping is applied before the pipe is placed in the trench, then special care shall be taken in handling the pipe so that the wrapping will not be damaged. Care shall also be exercised in backfilling around the pipe and fittings and in blocking fittings so as not to damage the wrapping. Any wrapping that may be damaged shall be repaired in a manner satisfactory to the Water Superintendent so as to form the best protection to the pipes.

3. Sand and Encasement

All pipe and fittings which are not enclosed in concrete valve vault or laid in encasement pipe, shall be completely encased with a minimum of eight (8") inches of sand. This encasement includes the bottom, sides and top of pipe and fittings including bells, so that all portions will be encased with a minimum of eight inches of sand to insulate the pipe from the natural ground and from the backfill. The sand shall be a finely divided sand as follows:

Sand Specifications:

Passing 7/8" Sieve:	100% by weight
Passing No. 4 Sieve:	80% by weight
Clay Lumps Not to Exceed:	20% by weight
Plasticity Index:	NP-10 max

Sand shall be screened and free of foreign material. Sand shall be placed in a manner that will not injure the polyethylene wrapping and shall be compacted under, around the sides, and over the pipe in a manner that will reduce settlement to a minimum and as approved by the Water Superintendent.

4. Trench

a) General: The trench shall be excavated true and parallel to the pipe center line with a minimum clearance of eight (8") inches below the pipe bottom and with a like clearance from the bottom of the bell to the bottom of the bell hole. The trench will then be refilled to the proper grade with sand as specified. The placing of the encasing material shall be done in such a manner so as to be free of all natural soil, rocks or other foreign matter.

After final grading in the trench of the encasing material, bell holes shall be excavated at each joint.

b) Depth of Trench: The depth of the trench shall be the cover over the pipe, plus the outside diameter of the pipe, plus the 8" compacted sand bed under the pipe.

c) Correction of Faulty Grade: Any part of the trench excavated below grade shall be corrected with sand backfill.

d) Pipe Foundation of Unstable Soil: When the bottom uncovered at sub-grade is soft and cannot support the pipe, a further depth shall be excavated and refilled to grade with sand or other material as approved by the Water Superintendent.

e) Sub-Grade in Rock and Other Debris: Should rocks, boulders, or other unsuitable soil conditions be encountered in the trench, the same shall be removed to a depth of eight (8") inches below the grade

line, and the trench refilled with sand or other approved material to the original grade line. Where trees, stumps or roots are encountered, they shall be removed and disposed of. All roots shall be cut off flush with the sides of the trench.

f) Trench Width: The trench width at ground surface may vary with and depend upon the depth and nature of the ground encountered. The maximum clear width of the trench, measured at a point six (6) inches above the top of the pipe, shall be eighteen (18") inches, plus the outside diameter of the barrel of the pipe.

g) Initial backfill zone: This is the sand encasement around the main.

h) Final Backfill Zone: This zone extends from the top of the initial backfill zone to the surface. This zone shall be filled with select excavated material free of concrete, pavement, caliche, large clods, and other material that will interfere with excavation.

5. Jointing Pipes

All pipes shall be made up in accordance with manufacturer's recommendation. Pipe deflection shall not exceed 75 percent of the maximum amount recommended by the manufacturer.

6. Concrete Thrust Blocks

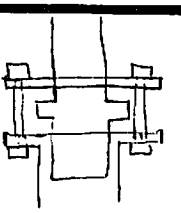
Thrust blocks shall be applied at all bends, tees, incomplete crosses and blow-offs, except at anchored fittings. The size and shape of the thrust blocking shall be as shown on the plans. Material for the thrust blocks shall be minimum 2,000 P.S.I. concrete at 28 days and shall be placed between solid ground and the fittings to be anchored.

The blocking shall be placed so that the pipe and fitting joints will be accessible for repair.

Temporary thrust blocks or other means of carrying thrust loads generated by hydrostatic testing shall be provided at all ends of lines to be tested. Details of the end connections and method of temporary blocking shall be submitted to the Water Superintendent for approval. After satisfactory completion of the hydrostatic test, the temporary blocking shall be removed by the contractor as specified by the Water Superintendent.

7. Pipe Fittings Installation

Installation of pipe and fittings shall be done in accordance with manufacturer's recommendations unless such recommendations conflict with provisions of this ordinance in which case the provisions of this ordinance will prevail.



8. Metal Harness

Metal harness, tie rods and clamps or swivel fittings shall be used to prevent movement when soil conditions will not withstand thrust blocking. Steel rods and clamps shall be galvanized or otherwise rust proofed or coated with hot coal tar enamel then wrapped with two layers of polyethylene wrapping.

9. Fire Hydrants

General

Fire hydrants shall be installed as specified or as shown on drawings. Each hydrant shall be connected to the main with a six (6") inch branch line controlled by an independent six (6") inch gate valve, open left. All pipe from the main tee to the fire hydrant shall be class 50 - 6 inch ductile iron pipe. Swivel or anchor fittings shall be used to connect the fire hydrant gate valve to the water main.

Location

Fire hydrants shall be located between the curb and sidewalk in such a manner as to provide complete accessibility, and also in such a manner that the possibility of damage from vehicles or of injury to pedestrians will be minimized. No driveway or fence shall be built within a three foot radius of the fire hydrant nor shall any permanent structure be built within a six foot radius of the fire hydrant.

Location with Reference to Curb Lines

When placed behind the curb, the fire hydrant barrel shall be set so that no portion of the pumper or hose nozzle cap will be less than eighteen (18") inches from the back side of the curb.

Location with Reference to Sidewalk

When set by a sidewalk, no portion of the hydrant or nozzle cap shall be within six (6") inches of the sidewalk.

Positions of Nozzles

* 18" to 20" up from finished grade

All hydrants shall stand plumb and shall have their hose nozzles parallel to the curb with the pumper nozzle perpendicular to the curb.

Thrust Blocking

A thrust block shall be provided at the bowl of each hydrant and shall be placed so as not to obstruct the drainage outlet of the hydrant.

10. Valve Boxes

When valves are in the street R.O.W. or public utility easement the top of the valve box shall be set flush with the pavement or surrounding ground. In cultivated areas, the top of the valve box shall be set 12" below natural ground and long enough to be raised to natural ground at a future date.

Cast iron valve boots shall be firmly supported, free and clear of the valve, and maintained centered and plumb over the wrench nut of the gate valve, with the box cover flush with the surface of the finished pavement. Valve boots and extensions shall be those specified herein. All geared valves and such other valves shall be set in masonry and/or reinforced concrete valve pits or boxes with the wrench nut readily accessible for operation through the manhole or valve box opening. Pits or boxes shall be constructed in a manner that will permit minor valve repairs and afford protection to pipe from impact or settlement where it passes through the pit or box walls.

11. Sterilization

The Contractor shall disinfect the new water main in accordance with A.W.W.A. C-601 latest edition.

Pipe, valves, hydrants and fittings shall be stored on timbers and kept clean. Where soil or other substance has come in contact with the water surfaces of the pipe or fittings, the interior shall be washed and sterilized with a two percent solution of calcium hypochlorite.

When the line is complete, has passed the hydrostatic test, and the new system has been connected to the existing system, and before bacteriological testing, the line shall be slowly filled with water between valves and allowed to stand for 48 hours. After sterilization period is completed, lines shall be flushed by the contractor under the direct supervision of a representative of the City Water Division. If the sample does not pass State Health Department purification standards, the procedure shall be repeated. The entire procedure shall be coordinated with and under the supervision of the Water Superintendent.

During the sterilization process City valves shall be operated only under the supervision of the Water Superintendent.

✳ Two series of bacteriological test failures shall require the contractor to pig the system before anymore bacteriological samples will be collected.

12. Interruption of Utility Service

No valve or other control on the existing City Water Distribution System shall be operated for any purpose by the contractor unless under direct supervision of the City Water Division. The contractor shall give forty-eight (48) hours notice for the need for closing or opening of existing valves unless an emergency exists.

W-87 Hydrostatic Testing of Pressure System

Description

This specification shall govern for all work necessary for hydrostatically testing the completed pressure system. The contractor shall provide all equipment, materials, labor, etc., as necessary, except as noted and accomplish all testing under this specification.

Materials

Water for filling the line and making tests will be furnished by the City of Corpus Christi through a standard meter connection. A meter and gage for testing will be supplied by the City. The test pump with appropriate connection points as approved by the Water Superintendent for the installation of meter and gage shall be furnished by the contractor. The meter shall be directly connected to the main or pipe being tested by the use of copper tubing or an approved reinforced hose. The meter shall be protected against extreme pressures by the use of a one (1") inch safety relief valve set at the test pressure plus ten pounds per square inch and furnished by the City.

Test Procedure

Tests shall be made only after the following occurs:

1. Subdivisions:

   A hydrostatic test shall be performed on the proposed water distribution system when all of the following conditions have been met.

   a. All valves are accessible and open,

   b. All fire hydrants are properly set (i.e. plumb, at the right height, and the correct horizontal placement),

   c. All curb and gutter has been installed,

   d. Caliche base on street has been installed, compacted and accepted as ready for black topping by the City Engineer,

   e. All lot grading has been completed,

   f. All sidewalks have been installed.

2. Apartment Complexes, Shopping Centers, and Other Than Subdivisions:

   A hydrostatic test shall be performed on the proposed water distribution system when all of the following conditions have been met:

a. The area above the water main has been graded five feet on either side of the center line of the water main and for the entire length of the line;

b. The owner signs an agreement to the effect that approval of the system is conditional upon completion of any items found deficient on a second inspection which will be conducted upon completion of the total project. Completion of the total project shall be as defined by the Water Superintendent.

3. Other:

Those water systems that are not found in one of the above catagories shall be tested upon acceptance by the Water Superintendent as being ready for testing.

All pipes shall be subjected to two hydrostatic tests. The first hydrostatic test shall be a two hour test at a pressure of 150 P.S.I. The allowable leakage during this portion of the test shall be the sum of the leakage allowances used in the system as shown in the following specifications manuals:

A.C.P. - - - - - - - - - - - A.W.W.A. Specifications

D.I.P./C.I.P - - - - - - - - A.W.W.A. Specifications

P.V.C. - - - - - - - - - - - A.W.W.A. Specifications

The second hydrostatic test shall be made no less than 48 hours after the successful completion of the first hydrostatic test. The second hydrostatic test will be for 24 hours at City pressure. There will be a zero leakage allowance during this test. During the test, all exposed pipe, fittings, valves, hydrants, and joints shall be carefully examined. If found to be leaking, they shall be corrected immediately by the contractor. If the leaking is due to cracked or defective material, the defective material shall be removed and replaced by the contractor with sound material. The test then shall be repeated until the pipeline is accepted. A $100 base fee will be paid by the contractor to the City for each retest that is required. No pipe installation will be accepted until the above conditions have been met.

1. NORTH ARROW

2. BENDS 1/16 (11 1/4°) 1/8 (22 1/2°) 1/4 (45°)

3. PROPERTY LINE — PL

4. SIDEWALK — SW

5. CURB

6. EDGE OF PAVEMENT — EOP

7. CENTER LINE — ℄

8. FIRE LINE — 6" — PL

9. BREAK LINE — 8"AC — 8"AC

10. REDUCER — 8"AC — 6"AC

11. CASING — 36" CAS. — 24

12. COMMERCIAL METER — 8" — 3 (SIZE OF METER)

13. RESIDENTIAL " — R

14. GAS METER G

15. SANITARY SEWER MANHOLE SS

16. STORM SEWER M.H. S

17. TELEPHONE MH T

18. CPL M.H. P

19. POWER POLE ○ (POLE NUMBER IF POSSIBLE)

20. TELEPHONE POLE ⊗ " "

21. LIGHT POLE ✲

22. RAILROAD

23. RAILROAD CROSSING SIGN X

24. STOP SIGN

25. STREET MARKER SIGN

26. BILLBOARD

27. SIGN (FREE STANDING) ○ IDENTIFY (e.g. - CIRCLE K)

28. FENCE — OR

29. FIRE HYDRANT - MEASURE FROM OPERATING NUT TO CENTER OF VALVE

30. CATCH BASIN — BOC

31. DRAIN TILES

32. EXPANSION JOINT - IN SIDEWALK — SW

EXPANSION JOINT — IN CURB — BOC — OR AT CURB RADIUS (MEASURE FROM BOC)

33. BUILDING — C — ADDRESS IF POSSIBLE

34. RESIDENCE — R — ADDRESS IF POSSIBLE

6" — 20" — 6"

35. 20" W. LINE UNDER ANOTHER (IN THIS CASE - 20" LINE IS UNDER 6" LINE)

REV. BY	DATE	DESCRIPTION	OK

CITY OF CORPUS CHRISTI
WATER DIVISION TEXAS ENGINEERING

WATER DEPT. STANDARD DRAFTING SYMBOLS

DN

APPROVED: [signature]
CONST. SUPERINTENDANT

SCALE
HOR. —
VERT. —

DW MG

DATE 12-21-81

SHEET 1 OF 1