



North Coast County Water District  
 2400 Francisco Blvd.  
 P.O. Box 1039  
 Pacifica CA 94044-6039  
 Phone (650) 355-3462  
 Fax # (650) 738-8329

Received Stamp

\_\_\_\_\_  
 Initials

## COMMERCIAL / MIXED-USE / MULTI-FAMILY WATER SERVICE APPLICATION

**Check all that apply:**     **New Service**     **Upgrade Existing Service**

Size of Services Requested	<u>Domestic Water Service</u>					Other Size	<u>Irrigation Water Service</u>	<u>Fire Sprinkler Water Service</u>			Other Size
	$\frac{5}{8}$ " X $\frac{3}{4}$ "	$\frac{3}{4}$ "	1"	1 1/2"	2"		Size	1"	1 1/2"	2"	
Number of Services Requested											

Applicant's Name \_\_\_\_\_ Phone \_\_\_\_\_ Fax \_\_\_\_\_  
 Owner's Name (if different) \_\_\_\_\_ Phone \_\_\_\_\_  
 Mailing Address \_\_\_\_\_ E-Mail \_\_\_\_\_

**Location of Property to be Served:** Assessor's Parcel Number (APN): \_\_\_\_\_

Street Address: \_\_\_\_\_

**I understand and agree to all conditions for water service as set forth in this Water Service Application.  
 (Read and initial each page of this multi-page application before signing.)**

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

**(DISTRICT USE ONLY)**

Application Processing Fee	\$ _____	Paid: cash <input type="checkbox"/> check <input type="checkbox"/> # _____	Date _____
Transmission & Storage Fee (for Domestic Service ONLY)	\$ _____	Paid: cash <input type="checkbox"/> check <input type="checkbox"/> # _____	Date _____
Installation Deposit Amount (Circle: Domestic    Fire    )	\$ _____	Paid: cash <input type="checkbox"/> check <input type="checkbox"/> # _____	Date _____
Final Invoice Amount	\$ _____	Refund Amount (if any) _____	Date _____

Holding Acct. No. \_\_\_\_\_ Customer Account # \_\_\_\_\_

# Water Service Requirements & Procedures

To be eligible for water service, the property to be served must front an existing water main capable of providing the degree of service requested while maintaining its ability to adequately serve the area. If the facilities are inadequate to provide the service requested the District requires that the applicant construct a pipeline extension or upgrade. In that case, the applicant is required to submit an Application for Projects Designed and Constructed by Applicant under District Review and Inspection and pay the appropriate fees and deposits.

To apply for a water meter installation the applicant must complete this Water Service Application. The applicant is responsible for all District charges, fees, and costs, including labor and materials, associated with the installation of water service and must submit a deposit to cover these costs. After completion of the installation, if District costs exceed the amount of the deposit, the applicant will be charged the difference. If District costs are less than the amount of the deposit, the District will refund the difference. The applicant must also pay an Application Processing Fee to cover administrative costs and, if applicable, the appropriate storage and transmission fee.

The applicant must comply with all federal, state, and local laws and regulations, and must have obtained all necessary permits and approvals required for the project for which water service is requested. The District assumes no responsibility for the determination as to which laws or regulations, if any, apply to the project. The applicant agrees to indemnify, defend, and hold harmless the District against any damages or liabilities arising from the failure of the applicant to comply with all applicable laws and regulations or failure to obtain any permit or other approval required for the project.

The application must be approved and the water service installed within eighteen (18) months from the date the District receives the application or all fees and deposits, less the application processing fee, will be refunded. The applicant must reapply when ready to proceed and pay current fees, deposits and follow current District standards and policies.

Once the water service line and meter are installed as part of this process, the occupant/applicant proposing to use the water must submit an Application for Water Supply before water can be turned on. If the applicant has not submitted the Application for Water Supply, the meter will be locked after it is installed. Once the Application for Water Supply has been submitted to and approved by the District, water service may begin.

**Applicant is responsible for trenching, backfilling and re-surfacing the roadway and/or sidewalk from water main, as identified by the General Manager or approved designee, to the proposed meter(s) per NCCWD and City of Pacifica standards. Applicant must call Underground Service Alert (USA) prior to commencement of any excavations at 1-800-227-2600 and follow all requirements set forth by USA. In addition, applicant is responsible for repairs to any damaged facilities or appurtenances during said excavation. Applicant must also obtain a City of Pacifica Encroachment Permit before beginning any excavation work located within the City's right-of-way. Copy of City of Pacifica Encroachment Permit and current USA Message Number shall be provided to the District prior to District service installation.**

## Limits on Liability

Pursuant to Ordinance No. 52 dated May 20, 1991

### Quantity of Water Supply

The District will endeavor to furnish, so far as is reasonably possible, but cannot guarantee, a continuous supply of water to its customers at a reasonable pressure at the District's meter, and will endeavor to avoid any shortage or interruption in water service. In the event that the District is unable to provide satisfactory water service by reason of insufficient or high pressure, inadequate volume of water or intermittent supply, the District shall not be liable to any customer for any damage or inconvenience that may occur as a result.

The District reserves the right to implement temporary emergency shut downs of the system due to operational difficulties, natural catastrophes and other causes which may prevent the provision of water service. The District, whenever it shall find it necessary or convenient for the purpose of making repairs or improvements to its system, shall have the right temporarily to suspend delivery of water and it shall not be liable for any loss or damage that may result. Repairs or improvements will be implemented as rapidly as is practicable and, so far as possible, at such times as will cause the least inconvenience to customers. Whenever possible and as time permits, all customers affected will be notified prior to such shutdowns.

### Quality of Water Supply

The District will endeavor to supply safe and potable water at all times; provided, however, the District specifically disclaims and gives no warranty, express or implied as to merchantability, fitness for purpose, chemical composition, quality or any other matter of water supplied. The District assumes no responsibility for loss or damage, including but not limited to personal injury, property damage and loss of profits, because of lack of merchantability, fitness of purpose, chemical composition or quality of water supplied. The District shall not be responsible for any loss or damage arising from leaks, breaks or corrosion in or to District facilities or non-District facilities as a result of the quality of water supplied.

## **Cross-Connection Control Requirements**

### **Pursuant to Ordinance No. 63-2025**

North Coast County Water District (District) is committed to protecting the public water system from actual or potential contamination caused by cross-connections. A cross-connection is defined as:

“Any actual or potential connection between the public water system or the Consumer’s water system and any source or system containing non-potable water or other substances through which backflow could occur. This includes bypass arrangements, jumper connections, removable sections, swivel or change-over devices, and other temporary or permanent configurations.”

In accordance with California State Water Resources Control Board (SWRCB) Cross-Connection Control Policy Handbook (CCCPH), all public water systems are required to develop and implement a Cross-Connection Control (CCC) Program.

#### **Applicant Responsibilities Under Ordinance No. 63-2025**

By signing this Water Service Application, the Applicant agrees to comply with the District’s Cross-Connection Control Program and Plan, including the following conditions:

##### **1. Water Use Questionnaire**

- Complete the Water Use Questionnaire included in the Commercial/Mixed-Use/Multi-Family Water Service Application.

##### **2. Premises Isolation Requirements**

Within 30 days of a District request (or an alternate schedule approved by the District), the Applicant agrees to:

- Install, maintain, test, and repair all premises isolation backflow prevention assemblies as required by the District and in accordance with District standards.
- Submit test and/or repair reports for all required assemblies to the District in a timely manner.

##### **3. Conditional Waiver of Premises Isolation Requirement**

If the District waives the requirement to install a reduced pressure principle backflow assembly at the service connection, the Applicant must:

- Authorize the District to conduct periodic on-site water use surveys of the premises.
- Install, test, maintain, and repair all required internal (in-premises) backflow prevention assemblies as specified by the District, within 30 days of request.
- Report test and/or repair results to the District within 30 days of receipt.
- Notify the District immediately of any plumbing system modifications, changes in water use, or the installation of any potential cross-connection hazards.

#### **Notice of Enforcement**

Failure to comply with the District’s Cross-Connection Control Program may result in enforcement actions, including service termination, in accordance with Ordinance No. 63-2025.

#### **Resources**

For more information or assistance, please contact the District’s Cross-Connection Control Program Coordinator at (650) 355-3462 or visit [nccwd.com](http://nccwd.com).

#### **San Mateo County Environmental Health Department**

Backflow prevention (which is based upon the degree of hazard to the District’s system) must be reviewed by San Mateo County Environmental Health Department. Applicant must arrange for review and plan check for conformance with backflow requirements by the San Mateo County Environmental Health Department by contacting Terrence Chun at (650) 363-4710. San Mateo County Environmental Health Department requires a plan check fee to be paid to that department and a Cross Connection Form to be filled out. North Coast County Water District requires sign off by San Mateo Environmental Health Department prior to completion of District plan check.

The backflow unit on the fire line shall conform to District Standard Detail NC-05, Double Detector Check Backflow Unit for Fire Service Connection, attached.

(See pages 5 and 6)

# Submittal Requirements for Commercial/Mixed-Use/Multi-Family Water Service Application

The checklist below is provided to help the applicant with the minimum items needed for a plan review for both domestic and fire services. **Incomplete applications will not be approved and will require additional plan review time resulting in delays.** Plans are reviewed on a first come, first served basis.

## Initial Submittal for Commercial/Mixed-Use/Multi-Family Water Service

- Signed Application
- Application Processing Fee – Paid Amount: **\$600**
- Plans Received

## Domestic Water Service

- 1 Set of Plans
  - a. Site Plan showing property lines, right of way, sewer lateral, size and location of proposed water service, and backflow prevention device (based upon degree of hazard).
  - b. Water Service Fixture Unit Count and Estimated Demand Load for each domestic service.
  - c. Plans designed to current District Standards.

## Irrigation / Landscaping Water Service

- 1 Set of Plans
  - Site Plan showing property lines, right of way, sewer lateral, size and location of proposed and existing water services, and backflow prevention device
  - Irrigation systems shall have an atmospheric vacuum breaker as per the District Standard Detail for Typical Private Atmospheric Vacuum Breaker.
  - Plans designed to current District Standards.

## Fire Sprinkler Water Service

- 1 Set of Plans
  - a. Site Plan showing property lines, right of way, sewer lateral, size and location of proposed and existing water services, and backflow prevention device (based upon degree of hazard).
  - b. Plans designed to current District Standards.
- Fire Sprinkler Calculations and Fire Protection Plans approved and stamped by City of Pacifica's Fire Marshall.

## Cross-Connection Hazard Assessment

- Contact the District to complete a Hazard Assessment with the Cross-Connection Control Program Coordinator at (650) 355-3462

Once the application is complete, the District will contact the applicant after it has reviewed the plans, the estimated demand load and / or fire sprinkler calculations and determined that it is able to supply the new service. The applicant will be asked to pay the appropriate Transmission and Storage Fees and required service installation deposit. Once the District has received the applicable fees, the District will coordinate the new and / or upgraded service installation.

The applicant / applicant's contractor is required to have the trenching complete prior to the scheduled installation date.

Installation of the service connection and meter, including water main tap, by District forces is on a first come, first served basis. Depending on the work load and emergencies, allow 4 to 6 weeks from the time the District receives the required meter installation deposit for the service to be installed.

# Water Use Questionnaire

## Non-Residential Customers



### Customer or Business information:

Customer/Business Name: \_\_\_\_\_ Customer Account Number: \_\_\_\_\_

Service Address: \_\_\_\_\_

### Is your business or premises of a type included in the table below? Check all that apply

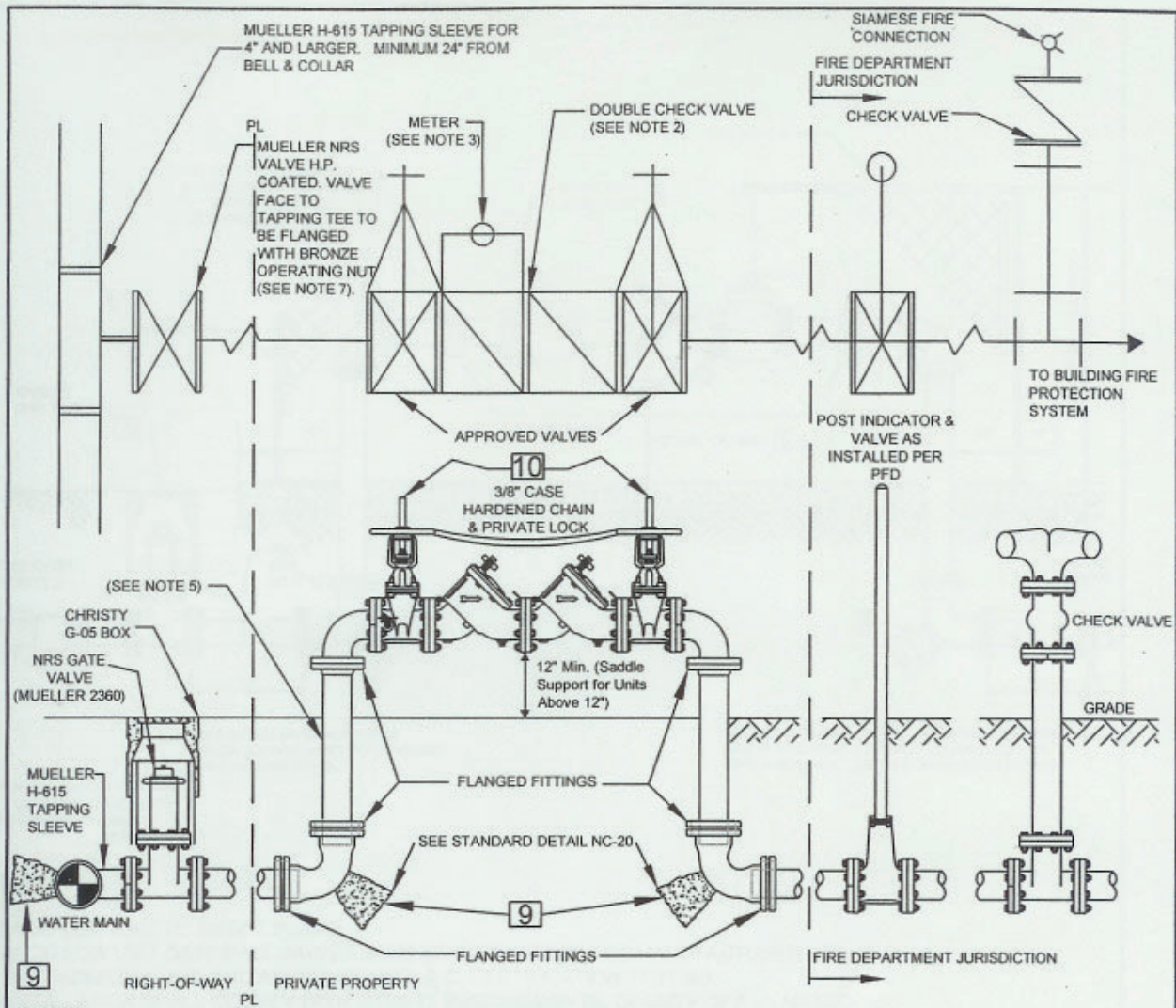
Description	Check if "Yes"	Description	Check if "Yes"
Agricultural (farm or dairy)	<input type="checkbox"/>	Metal plating industry	<input type="checkbox"/>
Beverage bottling plant	<input type="checkbox"/>	Mortuary	<input type="checkbox"/>
Car wash	<input type="checkbox"/>	Petroleum processing or storage plant	<input type="checkbox"/>
Chemical plant	<input type="checkbox"/>	Pier or dock	<input type="checkbox"/>
Commercial laundry or dry-cleaners	<input type="checkbox"/>	Radioactive material processing plant or nuclear reactor	<input type="checkbox"/>
Having both reclaimed water and potable water provided	<input type="checkbox"/>	Survey access denied or restricted	<input type="checkbox"/>
Film processing facility	<input type="checkbox"/>	Wastewater lift station or pumping station	<input type="checkbox"/>
Hospital, medical center, nursing home, veterinary, medical, or dental clinic, or blood plasma center	<input type="checkbox"/>	Wastewater treatment plant	<input type="checkbox"/>
Having separate irrigation system using NCCWD's water and adding chemicals (e.g. parks, playgrounds, golf courses, cemeteries, estates, etc.)	<input type="checkbox"/>	Having an unapproved auxiliary water supply interconnected with the potable water supply	<input type="checkbox"/>
Laboratory	<input type="checkbox"/>	RV storage with water supply & sewage connection	<input type="checkbox"/>

### Other potential cross-connection concerns:

- Irrigation System
- Fire sprinkler system, using  not using  chemicals or anti-freeze
- Swimming pool
- Other (describe): \_\_\_\_\_

**Thank you for taking the time to complete our Water Use Questionnaire.**

Signature: \_\_\_\_\_ Date: \_\_\_\_\_



**NOTES**

1. BACKFLOW POST INDICATOR AND CHECK VALVE ASSEMBLY TO BE SET PLUMB.
2. DOUBLE DETECTOR CHECK UNIT SHALL BE FROM U.S.C., DISTRICT APPROVED LIST.
3. DETECTION METER SHALL BE PURCHASED THROUGH THE WATER DISTRICT.
4. CHLORINATION AND SUBSEQUENT BACTERIOLOGICAL ANALYSIS REQUIRED. SAMPLES TO BE TAKEN BY THE DISTRICT WITH PAYMENT BY OWNER OR INSTALLING CONTRACTOR.
5. ALL PIPING MATERIAL SHALL BE DUCTILE IRON CLASS 52 OR AS APPROVED BY THE DISTRICT.
6. ALL ABOVE GROUND PIPE TO BE PRIMED WITH A NON-BLEEDING PRIMER WITH CORROSION RESISTANT PAINT. FINISH COAT AND COLOR TO BE DETERMINED BY THE DISTRICT ENGINEER.
7. ALL BOLTS, NUTS, WASHERS, TIE BACK EARS AND TIE BACK RODS SHALL BE TYPE 304 STAINLESS STEEL; THREADS COATED WITH ANTI SEIZE. ALL BOLTS SHALL BE TIGHTENED USING A TORQUE WRENCH TO MANUFACTURER'S SPECIFICATIONS.
8. UNDERGROUND PIPE TO BE BAGGED AND TAPED WITH ONE LAYER OF 8 MIL POLYETHYLENE AS PER AWWA C105.
9. CONCRETE THRUST BLOCKS REQUIRED AS PER STANDARD DETAIL NC-20, ALTERNATE RESTRAINT METHODS ARE SUBJECT TO DISTRICT APPROVAL.
10. VALVES TO BE MUELLER OS&Y GATE VALVES.
11. CHAIN AND LOCK VALVES WITH CASE HARDENED CHAIN AND PRIVATE LOCK.
12. DEVICE TO BE TESTED BY AN APPROVED TESTER AND TAGGED WITH COUNTY OF SAN MATEO DEPT. OF HEALTH TAG PRIOR TO APPROVAL FOR USE.

**NORTH COAST COUNTY WATER DISTRICT  
DOUBLE DETECTOR CHECK BACKFLOW UNIT  
FOR A FIRE SERVICE CONNECTION**

**STANDARD  
DETAIL  
NC-05**

SEPTEMBER 2004

# Determining the Size of Domestic Water

(Source: NCCWD Rate & Fee Schedule)

## Sizing of Domestic Water Meters

- A. Each domestic water meter shall be sized to provide adequate water supply (in conformance with the requirements for “adequate flow” and “minimum water pressure” as described in Chapter 6, UPC) for the premise, and the sizing of the domestic water meter shall be in conformance with the procedure described below. Water meters will not be installed and water service will not be provided at a new location until the owner/applicant has demonstrated to the District that the total peak flow demand is within the capacity of the domestic water meter requested for that location. After a meter has been installed and water service initially provided, the owner/applicant shall not install additional water-using devices, without the express written consent of the District.
- B. The size of the domestic water meters shall be determined by the following procedure:
- a. Step 1: The total estimated peak water supply demand on the domestic water meter shall be calculated as the sum of (a) the peak flow of plumbing fixtures as determined from Table A-2 in Appendix A of the current Uniform Plumbing Code (“UPC”), or as approved by District, or from similar charts and tables of subsequent editions of the UPC, and (b) the peak flow of other devices such as irrigation systems and equipment. The demand weight of plumbing fixtures not shown in the UPC will be assigned by the District based on other recognized industry publications where applicable and based on engineering experience of the District in all other cases.
  - b. Step 2: Select the smallest size of domestic water meter (or District approved combination of meters from the Table below which has or have sufficient capacity for the total estimated peak water supply demand calculated in Step 1:

Domestic Meter Size	Peak Flow Capacity in Gallons Per Minute
5/8 x 3/4-inch	20 GPM
3/4 inch	30 GPM
1-inch	50 GPM
1 1/2 inch	100 GPM
2-inch	160 GPM
3-inch	350 GPM

### **Submit this calculation along with the Application for Water Service Installation.**

Uniform Plumbing Code Table A-2 and Chart A-3 are attached for your convenience. Fixture unit counts which exceed the limits of Chart A-3 shall refer to Chart A-2 in the Uniform Plumbing Code to determine the Demand Load in GPM.

### Attachments:

Page 7 UPC Table A-2  
Page 8 UPC Chart A-3

Inch	mm
1/2	15
3/4	20
1	25

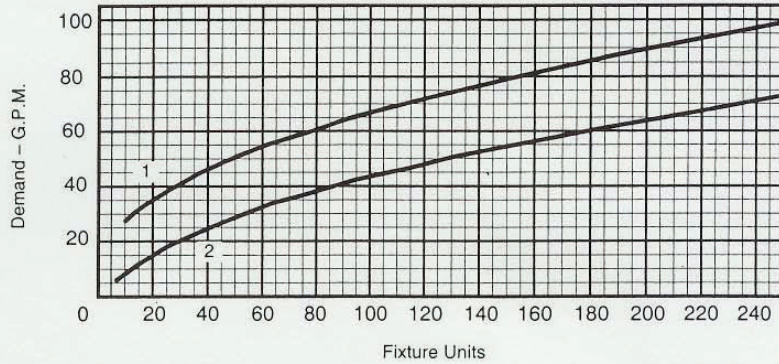
**TABLE A-2**  
**Water Supply Fixture Units (WSFU) and Minimum Fixture Branch Pipe Sizes<sup>3</sup>**

Appliances, Appurtenances or Fixtures <sup>2</sup>	Minimum Fixture Branch Pipe Size <sup>1,4</sup>	Private	Public	Assembly <sup>5</sup>
Bathtub or Combination Bath/Shower (fill) .....	1/2"	4.0	4.0	
3/4" Bathtub Fill Valve .....	3/4"	10.0	10.0	
Bidet .....	1/2"	1.0		
Clotheswasher .....	1/2"	4.0	4.0	
Dental Unit, cuspidor .....	1/2"		1.0	
Dishwasher, domestic .....	1/2"	1.5	1.5	
Drinking Fountain or Watercooler .....	1/2"	0.5	0.5	0.75
Hose Bibb .....	1/2"	2.5	2.5	
Hose Bibb, each additional <sup>7</sup> .....	1/2"	1.0	1.0	
Lavatory .....	1/2"	1.0	1.0	1.0
Lawn Sprinkler, each head <sup>5</sup> .....		1.0	1.0	
Mobile Home, each (minimum) .....		12.0		
<b>Sinks</b>				
Bar .....	1/2"	1.0	2.0	
Clinic Faucet .....	1/2"		3.0	
Clinic Flushometer Valve .....				
with or without faucet .....	1"		8.0	
Kitchen, domestic .....	1/2"	1.5	1.5	
Laundry .....	1/2"	1.5	1.5	
Service or Mop Basin .....	1/2"	1.5	3.0	
Washup, each set of faucets .....	1/2"		2.0	
Shower .....	1/2"	2.0	2.0	
Urinal, 1.0 GPF .....	3/4"	3.0	4.0	5.0
Urinal, greater than 1.0 GPF .....	3/4"	4.0	5.0	6.0
Urinal, flush tank .....	1/2"	2.0	2.0	3.0
Washfountain, circular spray .....	3/4"		4.0	
Water Closet, 1.6 GPF Gravity Tank .....	1/2"	2.5	2.5	3.5
Water Closet, 1.6 GPF Flushometer Tank .....	1/2"	2.5	2.5	3.5
Water Closet, 1.6 GPF Flushometer Valve .....	1"	5.0	5.0	6.0
Water Closet, greater than 1.6 GPF Gravity Tank .....	1/2"	3.0	5.5	7.0
Water Closet, greater than 1.6 GPF Flushometer Valve .....	1"	7.0	8.0	10.0

**Notes:**

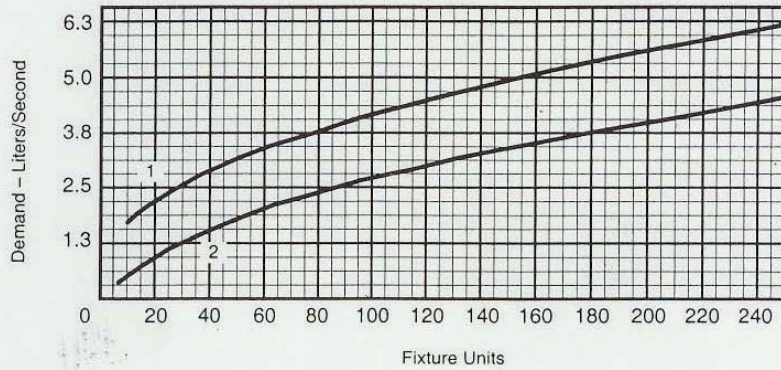
1. Size of the cold branch outlet pipe, or both the hot and cold branch outlet pipes.
2. Appliances, Appurtenances or Fixtures not included in this Table may be sized by reference to fixtures having a similar flow rate and frequency of use.
3. The listed fixture unit values represent their total load on the cold water service. The separate cold water and hot water fixture unit value for fixtures having both cold and hot water connections shall each be taken as three-quarters (3/4) of the listed total value of the fixture.
4. The listed minimum supply branch pipe sizes for individual fixtures are the nominal (I.D.) pipe size.
5. For fixtures or supply connections likely to impose continuous flow demands, determine the required flow in gallons per minute (GPM) and add it separately to the demand (in GPM) for the distribution system or portions thereof.
6. Assembly [Public Use (See Table 4-1)].
7. Reduced fixture unit loading for additional hose bibbs as used is to be used only when sizing total building demand and for pipe sizing when more than one hose bibb is supplied by a segment of water distributing pipe. The fixture branch to each hose bibb shall be sized on the basis of 2.5 fixture units.

**CHART A-3**  
Enlarged Scale Demand Load



Refer to UPC  
Chart A-2  
For Fixture  
Units Greater  
Than 240

**CHART A-3 (Metric)**  
Enlarged Scale Demand Load



SUPPLEMENTARY FIRE SPRINKLER CALCULATION SHEET

The District requires that a separate water meter be installed for fire sprinkler systems. Although in some cases a dedicated service line must be installed for the fire sprinkler system water meter, a “tee option” is sometimes available. Based upon the data provided on this *Supplementary Fire Sprinkler Calculation Sheet* you may be eligible to have the fire service installed by teeing off of the existing domestic water line. This option can potentially save money on installation because you would not be required to trench a line into the street beyond the easement area.

NOTE: This form must be completed by the homeowner’s licensed Fire Sprinkler System Design & Flow Calculation Contractor.

The purpose of this form is to provide the District and homeowner with minimum flow and pressure requirements for the proposed residential fire sprinkler system as measured at the output side of the fire sprinkler system water meter.

PROJECT LOCATION/ADDRESS: \_\_\_\_\_

HOMEOWNER(S) NAME(S): \_\_\_\_\_

FIRE SPRINKLER SYSTEM DESIGN CONTRACTOR: \_\_\_\_\_

CONTACT NAME: \_\_\_\_\_

PHONE NO.: \_\_\_\_\_

Minimum GPM required by the Fire Sprinkler System as measured at the output side of the fire sprinkler system water meter:	Gallons per Minute (GPM):
Minimum Static Pressure required by the Fire Sprinkler System as measured at the output side of the fire sprinkler system water meter:	Static Pressure (PSI):

**(NOTE: Round “as measured” pressure DOWN to nearest 5 psi increment (e.g. 89 psi measures + 85 psi on this form; 74 psi measured = 70 psi on this form)**

Fire Sprinkler System Design & Flow Calculation Contractor stamp and sign below:

# **WATER FLOW STANDARDS**

## **TYPE K COPPER TUBING SERVICE CONNECTIONS**

### **For Single Family Residential Structures**

<b>Single Service Connection <sup>1</sup></b>		
	<b>Gallon per Minute (GPM)</b>	
Nozzle Pressure <sup>3</sup>	<b>3/4"</b>	<b>1"</b>
40	73	144
45	78	153
50	82	161
55	86	169
60	90	176
65	94	183
70	97	190
75	101	197
80	104	203
85	107	210
90	110	216
95	113	222
100	116	227
105	119	233
110	122	239
115	124	244
120	127	249
125	130	254
130	132	259
135	135	264
140	137	269
145	140	274
150	142	279
175	154	301
200	164	322

<b>Dual Service Connection <sup>2</sup></b>		
	<b>Gallon per Minute (GPM)</b>	
Nozzle Pressure <sup>3</sup>	<b>3/4"</b>	<b>1"</b>
40	37	72
45	39	77
50	41	81
55	43	85
60	45	88
65	47	92
70	49	95
75	51	99
80	52	102
85	54	105
90	55	108
95	57	111
100	58	114
105	60	117
110	61	120
115	62	122
120	64	125
125	65	127
130	66	130
135	68	132
140	69	135
145	70	137
150	71	140
175	77	151
200	82	161

1. A “Single Service Connection” is one piping connection made to the North Coast County Water District water main that serves one single family residence.
2. A “Dual Service Connection” is one piping connection made to the North Coast County Water District water main that serves two single family residences.
3. Nozzles Pressures Measured with Pitot Gauge.

References:

- National Fire protection Association (NFPA) Fire Protection Handbook – 17<sup>th</sup> Addition
- International Fire Service Training Association (IFSTA) Fire Protection Publication – Fire Streams Practices – 7<sup>th</sup> Edition
- Standard Specification for Seamless Copper Water Tube (ASTM B88-03)