

SPECIFIC PLAN I: APPENDIX SP-12-A

POTABLE WATER SUPPLY SYSTEM DESIGN CRITERIA

POTABLE WATER DEMAND

Fire Flow Requirements

The Mountain House water system must comply with the County of San Joaquin fire flow requirements. Fire flows are estimated to be 4,400 gallons per minute (gpm) for the first Specific Plan area. This fire flow rate must be maintained for a period of two hours. Storage facilities and distribution pipelines will be designed to provide and convey the required fire flow on the assumption that it coincides with a maximum day demand.

Demand Calculations

Based upon the water demand factors and considerations discussed above, together with the anticipated land use acreages within the first Specific Plan area, the annual water demands have been calculated. The total annual water demand based on the conservation demand level, discussed in the Master Plan, is estimated to be 2,521 AF/YR (see Table 12.A.1). This water demand is approximately 25 percent of the total water demand associated with buildout of the entire Master Plan area. The majority of the water demand associated with the first Specific Plan is associated with the Central Mountain House subarea (see Table 12.A.2).

Because the water conservation measures discussed in the Master Plan (low-flush toilets, low-flow showerheads, water conserving appliances and low-water-using landscaping) will be implemented within the first Specific Plan, all water supply facilities will be designed based on the conservation demand level of 2,521 acre-feet per year.

Overall demand conditions, based on the County's peaking factors of 2.2 for maximum day demand and 3.8 for peak hour demand, in million gallons per day (mgd) are shown in Table 12.A.2.

Land Use	Acres (1)	Average Annual Water Use (AF/AC)	Conservation Demand w/ conservation w/o reclamation	Total Annual Water Use (AF/YR)
CENTRAL MOUNTAIN HOUSE				
Neighborhood E				
Low Density Residential	129	2		258
Medium Density Residential	82	2.5		205
Medium-High Density Residential	19	3		57
Neighborhood E Total	230			520
Neighborhood F				
Low Density Residential	117	2		234
Medium Density Residential	68	2.5		170
High Density Residential	24	3.5		84
Neighborhood F Total	209			488
Neighborhood G				
Low Density Residential	86	2		172
Medium Density Residential	98	2.5		245
Medium-High Density Residential	23.5	3		70.5
Neighborhood G Total	207.5			487.5
Other Land Uses				
Neighborhood Commercial	4.5	1.3		5.85
Community Commercial	19	1.3		24.7
Office Commercial	29.5	1.3		38.35
Business Park	37.5	1.3		48.75
Neighborhood Park	15	4		60
Community Park	54	4		216
Wetland	7.5	0		0
Easements	8	2		16
K-8 Schools	48	1.8		86.4
High School	46.5	1.8		83.7
Churches/Institutional	6	0.5		3
Arterial Street ROW	118	1		118
Other Land Use Total	393.5			700.75
Central Mountain House Total	1,040			2,196.25
OLD RIVER INDUSTRIAL PARK				
Limit ed Industrial	46	1.3		59.8
General Industrial	56.5	1.3		73.45
Wastewater Treatment Site	30	0.5		15
Utility Area	20	0.5		10
Collector Street ROW	10.5	0		0
Old River Industrial Park Total	163			158.25

**MOUNTAIN HOUSE
BUSINESS PARK**

General Commercial	27	1.3	35.1
Office Commercial	14.5	1.3	18.85
Business Park	71	1.3	92.3
Arterial Street ROW	20.5	1	20.5
Collector Street ROW	9	0	0
Mountain House Business Park Total	142		166.75
SPECIFIC PLAN I TOTAL	1,345		2,521.25 (2)

(1) Gross acres based on Land Use dated September 24, 1993

(2) Total for Specific Plan I is 2,521.25 af/yr, or 2.25 mgd

Mountain House Development Area	Total Annual Water Use (AF/YR)	Average Day Demand (mgd)	Maximum Day Demand (mgd)	Peak Hour Demand (mgd)
Central Mountain House	2,196.25	2.0	4.3	7.4
Old River Industrial Park	158.25	0.1	0.3	0.5
Mountain House Business Park	166.75	0.1	0.3	0.6
TOTAL	2,521.25	2.2	4.9	8.5

RAW WATER SUPPLY

Raw Water Conveyance System

Existing Facilities

Existing BBID facilities for delivery of water from the California Aqueduct to agricultural lands in the vicinity of the Mountain House project area include pump stations (Pump Stations 1 South, 2 South and 3 South), a system of canals flowing southeasterly along the 70-, 120- and 155-foot contour elevations, road crossings, siphons and numerous agricultural turnouts for deliveries to individual farmers.

Once development of the Mountain House project begins, the portions of the irrigation canals and agricultural turnouts which are located within the Mountain House project area will be abandoned. During development of the first Specific Plan area, portions of the 70-foot-elevation canal ("70 Canal") and "155 Canal" (near I-205) which lie within the first Specific Plan area will be abandoned. The remainder of the "70 Canal" and the "155 Canal" and the entire "120 Canal" will remain in operation throughout development of the first Specific Plan.

New Conveyance Facilities

Raw Water Conveyance. New facilities are required to convey untreated (raw) water from the Intake Channel of the California Aqueduct to the Mountain House water treatment plant. These

new facilities will include a new raw water pump station and new raw water transmission pipelines from the raw water pump station to the water treatment plant.

Based on space requirements for the raw water pump station and the costs associated with the raw water transmission pipeline, the raw water pump station will be located directly south of Byron Road along the Intake Channel to the California Aqueduct with the raw water transmission pipelines extending along the south side of Byron Road to the Herdlyn Substation, which will provide power to the raw water pump station, and then crossing over to the north side of Byron Road to the preferred water treatment plant site, thus avoiding the potentially sensitive wetlands area located south of Byron Road near the Alameda/San Joaquin County line (see Figure 1).

Both the new pump station and the pipeline(s) will need to convey the maximum day demands associated with the development of the first Specific Plan (approximately 5 million gallons per day, mgd). As discussed in the Master Plan, one 30-inch-diameter pipelines are ultimately planned for the raw water conveyance.

The new pump station will be equipped with electrically driven pumping units with the provision for backup diesel power in the event of a power outage. It is anticipated that the pump station building and the pumps needed to serve the initial phases of development will be constructed initially. One standby pump will be provided at all phases of the pump station phasing.

The CSD will directly, or by contract, operate and maintain the conveyance facilities including pumps and monitoring devices. Flow gauges for calculation of water charges will be the responsibility of BBID.

“155 Canal” Irrigation Water Bypass of Mountain House Business Park. The BBID service area parcel located east of Patterson Pass Road and east of the Mountain House business park is currently being provided water via BBID’s “155 Canal.” In order to maintain service to that parcel from BBID, a small pipeline and booster pump station must be constructed to convey water from the end of the “155 Canal” to the BBID parcel.

Preliminary estimates that 10-inch-diameter pipeline with pump will be required to serve the BBID service area parcel east of Patterson Pass Road. The pipeline shall have the capacity to convey 59 acre-feet per month operating on a 12 hour day. Operation and maintenance of the pipeline and pump station will be the responsibility of BBID. The proposed layout of this pipeline and pump station is shown on Figure 1. The pipeline shall have the capacity to convey 59 ac-ft per month based on operation of a 12 hour day.

WATER TREATMENT PLANT

Water Treatment Process

A complete discussion of the water treatment process to be utilized throughout the development of the Mountain House community is provided in the Master Plan.

Water Treatment Facility Design

A complete discussion on the water treatment components is provided in the Master Plan. A layout of the water treatment facilities required for the first Specific Plan area is provided on Figure 2.

Capacity Criteria

The capacity of the proposed Mountain House water treatment plant is based on the following two design criteria:

1. Maximum Day Demand; and
2. The ability of each component to adequately meet the drinking water standards, as previously discussed.

As discussed previously, the maximum day demand for the first Specific Plan is approximately 4.9 mgd. Therefore, to meet these demands, two phases of the water treatment plant (total capacity of two phases is 5 mgd) of the ultimate eight phases of the water treatment plant (total capacity 20 mgd) will need to be constructed.

The following describes the components to be constructed for this first Specific Plan:

Components	Number of Phases to be Constructed for First Specific Plan	Total Number of Phases
Clarifiers	2	8
Filters	2	8
Sludge Drying Beds	2	8
Raw Water Reservoirs	1	4
Clearwells	2	4
Washwater Recovery Ponds	1	4
Ozone Contactors	1	4

Only those phases of the water treatment plant required to serve the first Specific Plan area will be constructed initially. As shown on Figure 2, space will be reserved for future expansion of the water treatment facilities in subsequent development phases.

Water Treatment Residual Sludge Management Plan

As discussed in the Master Plan, during treatment of raw water, solids are removed from the raw water following the flocculation and sedimentation processes. Solids are also removed

during the filtration and sedimentation processes. The resulting sludge must be treated and disposed of in accordance with regulatory requirements.

Approximately one acre of sludge drying beds (divided into separate smaller beds) will be required to handle the water treatment sludge produced by the Mountain House water treatment plant at buildout of the first Specific Plan area. As with the other water treatment facilities, phased construction of the sludge drying beds is proposed.

At the maximum day flow of 4.9 mgd, the estimated sludge generation rate will be approximately 1,350 pounds per day. Based on a depth of fill of 0.1 feet per year, a disposal area of approximately two acres will be required.

WATER STORAGE FACILITIES

Criteria for Storage Facilities

Storage facilities provide both peak hour demands and emergency storage in the event of a fire, system shutdown or catastrophic event. The amount of storage in million gallons (MG) which will be required at buildout of the first Specific Plan is determined from three components as follows:

Emergency Storage	=	Two times average day demand	=	4.4 MG
Operational Storage	=	30 % of maximum day demand	=	1.5 MG
Fire Storage	=	4,400 gpm for 2 hours	=	<u>0.5 MG</u>
Total Storage Required				6.4 MG

Location and Sizing of Storage Facilities

For the development of the first Specific Plan, all of the storage discussed above will be at the water treatment plant site in concrete clearwells (approximately 5 million gallons). 0.7 million gallon storage tanks will be located within both the Mountain House Business Park and Old River Business Park subareas to meet peak and fire flow demands within those areas. An alternative for the Old River Business Park, would be to provide the additionally required storage at the water treatment plant in the clearwells.

After development of the first Specific Plan, additional storage may be required for subsequent development. Additional storage facilities may be added at either the water treatment plant site or at alternative sites within the project area.

BACKBONE WATER DISTRIBUTION SYSTEM

System Concept

The backbone water transmission distribution system consists of a looped series of water lines within the major roadway system that will convey potable water to all areas proposed for development within the first Specific Plan area. The distribution system be designed based on the "Conservation Demand Level" discussed previously. The backbone system will be expanded as needed for future development needs.

Pressure Zone

As discussed in the Master Plan, in order to provide service within a reasonable pressure range, the system will ultimately have three pressure zones; however, for the first Specific Plan, only two such pressure zones will be required; one for the Central Mountain House and Old River Industrial Park areas and one for the Mountain House Business Park area.

Distribution System

The layout of the proposed backbone system required for the first Specific Plan is shown on Figure 3. The pipeline sizes have been determined based on a computer model where design requirements were imposed to produce the most restrictive conditions.