
APPENDIX K

WATER SUPPLY ASSESSMENT

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May 23, 2023

Ashley James, Senior Planner
City of Berkeley
1947 Center Street, 2nd Floor
Berkeley, California 94704

Re: Water Supply Assessment – Gilman Gateway Rezone Project

Dear Ms. James:

This letter is in response to your request made on March 13, 2023, for water agency consultation (Enclosure 1) concerning the Water Supply Assessment (WSA) for the Gilman Gateway Rezone Project (Project), located in the City of Berkeley (City), which is within East Bay Municipal Utility District's (EBMUD's) Ultimate Service Boundary. EBMUD appreciates the opportunity to provide this response.

Pursuant to Sections 10910-10915 of the California Water Code, the Project meets the threshold requirement for an assessment of water supply availability because the Project proposes commercial development of more than 250,000 square feet of floor space.

Please note this WSA addresses the issue of water supply only and is not a guarantee of service; future water service is subject to the rates and regulations in effect at that time.

Project Demand

The water demand for the Project is accounted for in EBMUD's water demand projections, as published in EBMUD's Urban Water Management Plan (UWMP) 2020 (see <https://www.ebmud.com/water/about-your-water/water-supply/urban-water-management-plan/>). EBMUD's water demand projections account for anticipated future water demands within EBMUD's service boundaries and for variations in demand-attributed changes in development patterns. The existing land uses consist of surface parking lots and industrial, commercial and live/work use with a historical water use of approximately 13,100 gallons per day (GPD). The Project area is planned to be rezoned to allow a mix of light industrial, research and development, and laboratory and office uses consisting of approximately 1,005,300 square feet. The estimated water use at Project build-out is approximately 164,900 GPD.

EBMUD's demand projections indicate both densification and land use changes in a few existing land use classifications, including commercial and residential land use areas. These changes increase demand for EBMUD water. EBMUD's UWMP 2020 projects water demands over time, accounting for estimated variations in demand usage minus

conservation and recycled supply sources, as noted in the UWMP 2020, Table 3-1, 2050 Demand Projections (Table 1). Typically, EBMUD prepares a full demand study every ten years; the most recent version, the 2050 Demand Study, was completed in 2020, and the study results are incorporated into the UWMP 2020. For planning purposes, water demands are estimated in five-year increments, but it is recognized that actual incremental amounts may occur stepwise in shorter time increments. An increase in usage by one customer in a particular customer class does not require a strict gallon-for-gallon increase in conservation by other customers in that class, as, in actuality, the amount of potable demand, conservation and recycled water use EBMUD-wide will vary somewhat.

Table 1
2050 Demand Projections (UWMP 2020, Table 3-1)

TABLE 3-1	AVERAGE ANNUAL WATER DEMAND FORECAST 2050 DEMAND PROJECTIONS (MGD)						
	2020	2025	2030	2035	2040	2045	2050
FORECASTED WATER DEMAND	238	245	254	264	277	287	297
WATER CONSERVATION ¹	-48	-53	-58	-61	-63	-65	-66
RECYCLED WATER ¹	-5	-6	-6	-9	-13	-13	-13
RAW WATER	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
PLANNING LEVEL OF DEMAND (ROUNDED)	181	186	190	194	201	209	218

1. See Chapters 6 and 5 for more specific program details on conservation and water recycling, respectively. The goals reflected in this table take into account uncertainty as described in Section 5.2.3 and Section 6.1.3.

Project Area

The Project is located in the City of Berkeley and consists of 18 parcels totaling approximately 11.5 acres. The Project area is bisected by Second Street and bounded by Interstate 80 to the west, Gilman Street to the north, Third Street (Union Pacific Railroad and Amtrak heavy rail corridor) to the east, and Page Street to the south.

EBMUD Water Demand Projections

Since the 1970s, water demand within EBMUD's service area has ranged from 200 to 220 million gallons per day (MGD) in non-drought years. Section 3.1 of the UWMP 2020 outlines past and current EBMUD water demand, including Figure 3-1 which shows historic water use (including metered and unmetered demands) within EBMUD's service area, along with the number of customer accounts. The 2050 water demand forecast of 297 MGD for EBMUD's service area can be reduced to 218 MGD with the successful implementation of water recycling and conservation programs, as outlined in the UWMP 2020. Current demand is lower than estimated in the 2050 Demand Study as a result of the current drought and recent multi-year drought in 2014-2016. The difference is because the planning level of demand may differ from the actual demand in any given year due to water use reductions that typically occur during droughts. After droughts, a rebound effect is expected wherein demand rises back to projected levels. Thus, the 2050 Demand Study still reflects a reasonable expectation for demands in future years, as the demands are expected to gradually increase back to 2050 projected demand levels as development and

water use return to pre-drought and pre-recession conditions. The proposed Project's future development and operations will not change EBMUD's 2050 demand projection.

EBMUD Water Supply, Water Rights and the UWMP 2020

EBMUD has water right permits and licenses that allow for water delivery from the Mokelumne River to the East Bay, subject to the availability of Mokelumne River runoff and the senior water rights of other users. EBMUD's position in the hierarchy of Mokelumne River water users is determined by a variety of agreements between Mokelumne River water right holders and the terms of the appropriative water right permits and licenses.

Conditions that could, depending on hydrology, restrict EBMUD's ability to receive its full entitlement include:

- Upstream water use by senior water right holders.
- Downstream water use by riparian and senior appropriators and other downstream obligations, including protection of public trust resources.
- Variability in precipitation and runoff.
- Curtailments by State Water Resources Control Board.

During prolonged severe droughts, the Mokelumne River supply cannot meet EBMUD's projected customer demands. To address this, EBMUD has completed construction of the Freeport Regional Water Facility and is evaluating future local groundwater projects in the East Bay Plain Subbasin (EBP Subbasin) as part of a Groundwater Sustainability Plan (GSP), which are discussed below in the Supplemental Water Supply and Demand Management section of this assessment. EBMUD has obtained and continues to seek supplemental supplies.

The UWMP 2020, adopted on June 22, 2021, by EBMUD's Board of Directors under Resolution No. 35234-21, is a long-range planning document used to assess current and projected water usage, water supply planning, and conservation and recycling efforts. The Water Shortage Contingency Plan (WSCP) 2020, also adopted on July 22, 2021, by EBMUD's Board of Directors under Resolution No. 35235-21 for inclusion as Attachment 1 within the UWMP 2020, is a document used to develop a coordinated response for when water shortages occur (for example, due to drought, earthquakes, and other emergencies that could impact EBMUD's ability to supply water to customers), and to guide EBMUD's planning and response through thoughtful assessment and management of the water supply.

EBMUD's water supply sources are discussed in Section 1.4.3 of the UWMP 2020. EBMUD's main water supply is the Mokelumne River, and EBMUD has rights to receive up to 325 MGD of water from this source subject to the availability of runoff, senior water rights of other users, and downstream fishery flow requirements. EBMUD also has a Long-Term Renewal Contract (Contract No. 14-06-200-5183A-LTR1) with the United States (U.S.) Bureau of Reclamation to receive water from the Central Valley Project (CVP)

through the Freeport Regional Water Facility in years when EBMUD's water supplies are relatively low (for more details, see Section 1.4.3 of the UWMP 2020). During some dry years, EBMUD may purchase water transfers to help meet customer demands. Section 4.2 of the UWMP 2020 discusses EBMUD's water transfer program.

EBMUD maintains a biennial budget and five-year capital improvement program to optimize investments and maximize drinking water quality, and the reliability, safety, flexibility, and overall efficiency of the water supply system. EBMUD's most recently adopted budget, which includes capital expenditures for the delivery of water supplies to its customers, can be found at <http://www.ebmud.com/about-us/investors/budget-and-rates/>.

EBMUD complies with applicable local, state, and federal regulations in the operation of its water supply system. Figure 1-4 of the UWMP 2020 illustrates the numerous local, state, and federal agencies that may regulate EBMUD's facilities and operations.

A summary of EBMUD's demand and supply projections, in five-year increments, for a 30-year planning horizon is provided in UWMP 2020 Attachment 1, WSCP, Table W-3, Supply and Demand Assessment, 2020-2050 (Table 2).

Table 2
Supply and Demand Assessment, 2020-2050 (UWMP 2020, WSCP
Table W-3)

TABLE W-3		SUPPLY & DEMAND ASSESSMENT, 2020-2050						
EBMUD PLANNING LEVEL OF DEMAND (PLOD)		2020	2025	2030	2035	2040	2045	2050
NORMAL YEAR	MOKELUMNE SUPPLY (MGD)	>181	>186	>190	>194	>201	>209	>218
	EBMUD PLANNING LEVEL OF DEMAND (PLOD) (MGD)	181	186	190	194	201	209	218
	NEED FOR WATER (TAF)	0	0	0	0	0	0	0
SINGLE DRY YEAR	MOKELUMNE SUPPLY (MGD)	121	126	129	132	138	144	151
	CVP SUPPLIES (MGD)	60	60	60	60	60	60	60
	TOTAL SUPPLIES (MGD)	181	186	189	192	198	204	211
	VOLUNTARY RATIONING (%)	0	0	1	1	2	2	3
	NEED FOR WATER (TAF)	0	0	0	0	0	0	0
SECOND DRY YEAR	MOKELUMNE SUPPLY (MGD)	82	86	89	92	98	104	111
	CVP SUPPLIES (MGD)	74	74	74	74	74	74	74
	TOTAL SUPPLIES (MGD)	156	161	164	167	172	178	185
	MANDATORY RATIONING (%)	13	13	13	14	14	14	15
	NEED FOR WATER (TAF)	0	0	0	0	0	0	0
THIRD DRY YEAR	MOKELUMNE SUPPLY (MGD)	141	145	146	145	132	118	105
	CVP SUPPLIES (MGD)	12	12	12	12	12	12	12
	TOTAL SUPPLIES (MGD)	153	157	158	157	144	130	117
	MANDATORY RATIONING (%)	15	15	15	15	15	15	15
	NEED FOR WATER - BASE CONDITION (TAF)	0	0	0	0	28	52	75
	NEED FOR WATER - HIGH DEMAND SCENARIO (TAF)	0	0	21	35	60	97	125
	NEED FOR WATER - EXTREME DROUGHT SCENARIO (TAF)	0	0	0	13	32	55	84

EBMUD's evaluation of water supply availability accounts for the diversions of both upstream and downstream water right holders and fishery releases on the Mokelumne River. Fishery releases are based on the requirements of a 1998 Joint Settlement Agreement (JSA) between EBMUD, U.S. Fish and Wildlife Service, and the California Department of Fish and Wildlife. The JSA requires EBMUD to make minimum flow releases from its reservoirs to the lower Mokelumne River to protect and enhance the

fishery resources and ecosystem of the river. As this water is released downriver, it is, therefore, not available for use by EBMUD's customers.

The available supply and demand shown in Table 2 were derived from EBMUD's baseline hydrologic model with the following assumptions:

- Customer demand values are based on the 2050 Demand Study, and planning-level demands account for projected savings from water recycling and conservation programs.
- EBMUD Drought Planning Sequence assumes water years 1976, 1977 and a modified 1978 hydrology.
- Total system storage is depleted by the end of the third year of the drought.
- EBMUD will implement its Drought Management Program (DMP) when necessary.
- The diversions by Amador and Calaveras Counties upstream of Pardee Reservoir will increase over time, eventually reaching the full extent of their senior rights.
- Releases are made to meet the requirements of senior downstream water right holders and fishery releases, as required by the JSA.
- EBMUD allocation of CVP supply, as available each drought year based on model results generated by the Department of Water Resources, is available the first year of a drought and subsequent drought years, according to the U.S. Bureau of Reclamation's (USBR) Municipal and Industrial Shortage Policy. However, in some severe dry years, USBR could make a determination of insufficient CVP water supplies and therefore limit further the allocation amounts that EBMUD would receive. During the 2014-2016 drought, EBMUD's CVP allocation went as low as 25 percent, and the extreme drought scenario in Table 2 reflects this reduced allocation.

The UWMP 2020 concludes that EBMUD has, and will have, adequate water supplies to serve existing and projected demand within the Ultimate Service Boundary during normal and wet years, but that deficits are projected for multi-year droughts. During multi-year droughts, EBMUD may require significant customer water use reductions and may also need to acquire supplemental supplies to meet customer demand.

As discussed in the UWMP 2020 WSCP, EBMUD's system storage generally allows EBMUD to continue serving its customers during dry-year events. EBMUD typically imposes water use restrictions based on the projected storage available at the end of September and may also implement water use restrictions in response to a State of California mandate. By imposing water use restrictions in the first dry year of potential drought periods, EBMUD attempts to minimize water use restrictions in subsequent years if a drought persists. Throughout dry periods, EBMUD must continue to meet its current and subsequent-year fishery flow release requirements and obligations to downstream agencies.

The UWMP 2020 WSCP includes DMP Guidelines that establish the level of water use restrictions EBMUD may implement under varying conditions. Under the DMP Guidelines, water use restrictions may be determined based upon projected end-of-September Total System Storage (TSS). When state-mandated water use restrictions exceed the reductions that would otherwise be called for based upon end-of-September TSS, EBMUD's water use reduction requirements may be guided by the applicable state mandates. Under either scenario, while EBMUD strives to keep water use reductions at or below 15 percent, if the drought is severe, mandatory water use reductions could exceed 15 percent.

Despite water savings from EBMUD's aggressive conservation and recycling programs and water use restrictions called for in the DMP Guidelines, supplemental supplies are still needed in significant, severe, and critical droughts. The proposed Project will be subject to the same drought restrictions that apply to all EBMUD customers. In addition, the proposed Project will be subject to EBMUD's regulations aimed at encouraging efficient water use, such as Sections 29 and 31 of EBMUD's Regulations Governing Water Service. Section 29, "Water Use Restrictions," promotes efficient water use by EBMUD customers and prohibits certain uses of potable water. Section 31, "Water Efficiency Requirements," identifies the types of water efficiency requirements (i.e., maximum flow rates for flow control devices) for water service.

Supplemental Water Supply and Demand Management

The goals of meeting projected water needs, and increased water reliability rely on supplemental supplies, improving reliability of existing water supply facilities, water conservation, and recycled water programs. Chapter 4 of the UWMP 2020 describes potential supplemental water supply projects that could be implemented to meet projected long-term water demands during multi-year drought periods.

The Freeport Regional Water Facility became operational in February 2011. EBMUD's ability to take delivery of CVP water through the Freeport Regional Water Facility is based on its Long Term Renewal Contract (LTRC) with the U.S. Bureau of Reclamation. The LTRC provides for up to 133,000 acre feet of CVP supply in a single dry year, not to exceed a total of 165,000 acre feet in three consecutive dry years. Under the LTRC, the CVP supply is available to EBMUD only in dry years when EBMUD's total stored water supply is forecast to be below 500,000 total acre feet on September 30 of each year.

EBMUD is the Groundwater Sustainability Agency (GSA) for the portion of the East Bay Plain Subbasin underlying its service area, and as a GSA, is finalizing a Groundwater Sustainability Plan (GSP) that includes the first phase of the Bayside Groundwater Project. Construction of the first phase (Bayside Groundwater Project Phase 1) was completed in 2010, allowing EBMUD to pilot injection of treated potable water into a deep aquifer in the South East Bay Plain Groundwater Basin for later extraction, treatment, and use during severe droughts. A permit from the Department of Public Health is required before groundwater extraction can be piloted for municipal use. Additional information on the Bayside Groundwater Project can be found in Section 4.1.1 and the WSCP of the UWMP

2020. As part of the GSP management actions, EBMUD will collect additional data and use science-based decision making to inform whether future expansion of Bayside or other groundwater projects are necessary.

Chapter 4 of the UWMP 2020 also lists other potential supplemental water projects, including Northern California water transfers, Bayside Groundwater Project Expansion, expansion of Contra Costa Water District's Los Vaqueros Reservoir, and others that could be implemented to meet the projected long-term water supplemental need during multi-year drought periods. The UWMP 2020 identifies a broad mix of projects, with inherent scalability and the ability to adjust implementation schedules for particular components, which will allow EBMUD to pursue the necessary supplemental supplies while minimizing the risks associated with future uncertainties, such as project implementation challenges, evolving regulatory requirements, and global climate change. The Environmental Impact Report that EBMUD certified for the Water Supply Management Program 2040 examined the impacts of pursuing these supplemental supply projects at a program level. Separate project-level environmental documentation will be prepared, as appropriate, for specific components as they are developed in further detail and implemented in accordance with EBMUD's water supply needs.

In addition to pursuing supplemental water supply sources, EBMUD also maximizes resources through continuous improvements in the delivery and transmission of available water supplies and investments in ensuring the safety of its existing water supply facilities. These programs, along with emergency interties and planned water recycling and conservation efforts, would ensure a reliable water supply to meet projected demands for current and future EBMUD customers within the current service area.

Water Conservation and Recycled Water Considerations

The Project presents opportunities to incorporate water conservation measures. Conditions of approval for the implementation of the proposed Project should require that the Project comply with the California Model Water Efficient Landscape Ordinance (Division 2, Title 23, California Code of Regulations, Chapter 2.7, Sections 490 through 495). EBMUD staff would appreciate the opportunity to meet with the City to discuss conservation measures. This meeting will explore early opportunities to expand water conservation via EBMUD's conservation programs and best management practices applicable to the Project.

Conservation strategies will be required to achieve water use reduction goals and restrictions, including compliance with Sections 29 and 31, described above, of EBMUD's Regulations Governing Water Service, and all other legally mandated water conservation requirements. The State of California is developing a new regulatory framework for urban water conservation based on two policy bills, Senate Bill 606 and Assembly Bill 1668, passed in 2018. These bills direct the State to establish water use efficiency targets for urban water agencies based on indoor residential water use, outdoor water use, and distribution systems. EBMUD will continue to comply with State water conservation regulations as they are developed.

Ashley James, Senior Planner

May 23, 2023

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EBMUD's current recycled water infrastructure does not extend to the project area; however, the site is located within EBMUD's East Bayshore Recycled Water Project designated service boundaries and as part of the EBMUD's long term water supply planning, future expansion plans will extend recycled water along Interstate 80 adjacent to the project area. As EBMUD advances plans and implements its recycled water supply expansion, EBMUD requires the City and project sponsors to coordinate closely with EBMUD and provide an estimate of expected water demand for potential recycled water uses for each specific project during the planning of the project to further explore the options and requirements relating to recycled water use. Accordingly, EBMUD will continue to assess and consider the feasibility of providing recycled water to the project area for appropriate uses.

The Project sponsor should contact Jennifer L. McGregor, Senior Civil Engineer, at (510) 287-1030 for further information.

Sincerely,



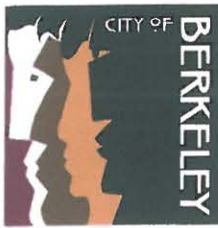
David J. Rehnstrom
Manager of Water Distribution Planning Division

DJR:CW:kvv

wdpd23_099 Gilman Gateway Rezone WSA - Letter

Enclosure: 1. Letter of Request for Water Supply Assessment dated March 13, 2023

cc: Board of Directors



Internal

Planning and Development Department
Land Use Planning Division

March 13, 2023

drehnstr@ebmud.com

David J. Rehnstrom
Manager of Water Distribution Planning
East Bay Municipal Utility District
375 Eleventh Street
Oakland, CA 94607-4240

Subject: Request for Confirmation of Water Supply Assessment for the proposed Gilman Gateway Rezone Project, Berkeley (SCH No. 2022120549)

Dear Mr. Rehnstrom:

Pursuant to Section 10910 of the Water Code, the City of Berkeley is submitting this request to the East Bay Municipal Utility District (EBMUD) for a water supply assessment. The City is requesting EBMUD to determine whether the projected water demand associated with the proposed Gilman Gateway Rezone Project (project) was included in the adopted Urban Water Management Plan and, if it was not included, to prepare a water supply assessment as outlined in Section 10910(c)(3) of the Water Code. The assessment is required in order to determine whether adequate water supply is available to meet the project water demand for the project. This request considers your comments, dated February 9, 2023 (enclosed) on the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the proposed project.

The approximately 11.5-acre project site is comprised of 18 parcels in West Berkeley bisected by Second Street and bordered by Gilman Street to the north, the Union Pacific Railroad (UPRR) and Amtrak heavy rail corridor to the east, Page Street to the south, and Eastshore Highway to the west. A table summarizing the existing parcels and buildings is included as an attachment. The project site is primarily developed with industrial buildings with manufacturing and warehouse uses, the majority of which are vacant. Currently, a total approximately 75 employees work on the project site. The proposed project would include the establishment of a new zoning district to facilitate future buildout of up to 1,005,300 square feet of a mix of light manufacturing, research and development (R&D), laboratory, or office uses. It is estimated that the proposed uses would generated a maximum of approximately 2,875 employees, for an increase of approximately 2,800 employees compared to existing conditions.

The City respectfully requests that EBMUD prepare a water supply assessment for the proposed project as described herein. To assist EBMUD with the assessment, projected water demand calculations for the proposed project are also attached to this letter. The City

Internal

acknowledges that this request for an assessment is a required part of the environmental documentation for the project. We appreciate your prompt response to this request.

I can be reached by email at AJames@cityofberkeley.info or by mail at:

Ashley James, Senior Planner
City of Berkeley
Planning and Development Department, Land Use Planning Division
1947 Center Street, 2nd Floor
Berkeley, California 94704

Thank you for your consideration of this request.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Ashley James', with a stylized flourish at the end.

Ashley James, Senior Planner

Attachments:

Existing Parcel and Building Summary
Water Use Estimate for the Gilman Gateway Rezone Project
EBMUD Water Use Factors Used to Develop the Water Use Estimate

Table 1: Existing Parcel and Building Summary

Assessor's Parcel Number	Street Address	Building Use	Lot Size (square feet)	Building Size (square feet)
Pacific Steel Casting				
59-2344-1-2	1305 Eastshore Highway	Vacant - Former Industrial/Manufacturing	7,657	1,010
59-2341-4	1401 Eastshore Highway		40,022	26,217
59-2340-8-2	1421 Second Street		102,399	73,640
59-2341-5	1420 Second Street		27,995	19,942
59-2344-4-1	1320 Second Street		54,496	44,343
59-2344-3-1	1314 Second Street		14,000	12,504
59-2345-9	1333 Second Street		36,581	14,840
59-2345-2-2	1310 Third Street		26,604	26,550
59-2345-1	1311 Second Street 630 Gilman Street 640 Gilman Street		44,563	31,560
Berkeley Forge and Tool				
59-2344-7	1331 Eastshore Highway	Industrial/Manufacturing	39,186	31,092
59-2344-5-1	1330 Second Street		12,076	12,030
59-2345-8-1	1337 Second Street	Industrial/Manufacturing	14,632	2,432
59-2345-6-1	635 Camelia Street	Industrial/Manufacturing	13,002	9,024
59-2345-4	643 Camelia Street	Industrial/Manufacturing	5,501	Undeveloped land* current uses include storage of materials, no permanent structures are on the site
Other Ownership				
58-2345-2-1	1306 Third Street	Live/Work	6,651	6,204
59-2344-2-1	600 Gilman Street	Vehicle Rental	11,624	1,008
59-2341-3-2	1433 Eastshore Highway	Approved Recycled Materials Processing use no longer operational. Property currently used for storage of materials.	37,543	1,944
59-2345-7	631 Camelia Street 625 Camelia Street	Industrial/Manufacturing (Clearflow Valves)	8,101	5,730
Total			502,633	320,070

Source: Berkeley, City of. 2023.

**GILMAN GATEWAY REZONE PROJECT
WATER USAGE ESTIMATE**

Use	Unit (Square Feet)	Typical Water Demand (gallons per unit)	Average Daily Water Demand (gpd)
R&D/Office	1,005,300	0.173	173,917

Flowrate factor is based on reference material provided by EBMUD (see attachment)

0.173 gpd/sf for general office (-10 years)

Attachment 3

WASTEWATER ENGINEERING

Treatment, Disposal,
and Reuse

Third Edition

METCALF & EDDY, INC.

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Commercial facilities. The water used by commercial facilities for sanitary purposes will vary widely depending on the type of activity (e.g., an office as compared to a restaurant). Typical water-use values for various types of commercial facilities are reported in Table 2-3. For large commercial water-using facilities such as laundries and car washes, careful estimates of actual water use should be made.

Institutional facilities. Water used by facilities such as hospitals, schools, and rest homes is usually based on some measure of the size of the facility and the type of housing function provided (e.g., per student or per bed). Water use for schools will vary significantly depending on whether the students are housed on campus or are day students. Representative water-use values for institutional facilities are reported in Table 2-4.

TABLE 2-3
Typical rates of water use for commercial facilities^a

User	Unit	Flow, gal/unit · d	
		Range	Typical
Airport	Passenger	3-5	4
Apartment house	Person	100-200	100
Automobile service station	Employee	8-15	13
	Vehicle served	8-15	10
Boarding house	Person	25-50	40
Department store	Toilet room	400-600	550
	Employee	8-13	10
Hotel	Guest	40-60	50
	Employee	8-13	10
Lodging house and tourist home	Guest	30-50	40
Motel	Guest	25-40	35
Motel with kitchen	Guest	25-60	40
Laundry (self-service)	Machine	400-650	550
	Wash	45-55	50
Office	Employee	8-20	15
Public lavatory	User	3-6	5
Restaurant (including toilet)	Customer	8-10	9
	Customer	3-8	6
	Customer	2-4	3
	Seat	15-25	20
Shopping center	Parking space	1-3	2
	Employee	8-13	10
Theater	Seat	2-4	3
	Car	3-5	4

^a Adapted in part from Refs. 7 and 8.

Note: gal × 3.7854 = L

TABLE 2-4
Typical water-

User
Assembly hall
Hospital, medical
Hospital, mental
Prison
Rest home
School, day
With cafeteria, g
and showers
With cafeteria or
Without cafeteria
School, boarding

^a Adapted in part from
Note: gal × 3.7854 = L

Recreati
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involving water

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new water line
flushing of sew
sanitary sewer

Water Supply Planning

David W. Prasifka



Krieger Publishing Company
Malabar, Florida
1994

Table 1-6. Summary of Commercial and Institutional Water Use.

Type of Establishment or Institution	Selected Parameter	Annual Water Use (gpd/unit)		Maximum Day Water Use (gpd/unit)		Peak Hour Water Use (gpd/unit)	
		Expected	Design	Expected	Design	Expected	Design
Primary and secondary schools							
public elementary	gpd/student	5.38	8.67	9.68	13.00	49.10	52.40
public senior high	gpd/student	5.64	9.75				
public junior high	gpd/student	6.63	12.20	19.60	25.20	121.00	127.00
private elementary	gpd/student	2.24	6.09	3.10	6.92	25.70	29.50
private senior high	gpd/student	10.40	18.60	15.70	23.90	38.70	46.90
combined (grades 1-12)	gpd/student	8.49	18.70	16.80	27.00	51.30	61.50
Colleges							
students in residence	gpd/student	106	179	114	187	250	323
nonresident students	gpd/student	15	*	27	*	58	*
Hospitals	gpd/bed	346	559	551	764	912	1120
Nursing homes and institutions	gpd/bed	113	209	146	222	424	500
Apartments							
high-rise	gpd/occupied unit	218	322	426	530	745	849
garden-type	gpd/occupied unit	213	315	272	374	671	773
Hotels							
	gpd/sq. ft.	0.256	*	0.294	*	0.433	*
Motels							
	gpd/sq. ft.	0.224	0.326	0.461	0.563	1.55	1.65
Office buildings							
general offices (- 10 years)	gpd/sq. ft.	0.093	0.164	0.173	0.244	0.521	0.592
general offices (+ 10 years)	gpd/sq. ft.	0.142	0.273				
medical offices	gpd/sq. ft.	0.618	*	1.660	*	4.970	*
Department stores							
	gpd/sq. ft. of total sales area	0.216	0.483	0.388	0.655	0.958	1.230
Shopping centers		0.180	*	0.232	*	0.412	*
Car washes							
	gpd/sq. ft.	4.78	*	10.3	*	31.5	*
Service stations							
	gpd/sq. ft. of garage & office space	0.251	0.485	0.590	0.824	4.890	5.120
Laundries							
commercial laundries & dry cleaners	gpd/sq. ft.	0.253	0.639	0.326	0.712	1.570	1.960
laundromats	gpd/sq. ft.	2.170	6.390	*	*	*	*
Restaurants							
drive-ins (parking only)	gpd/car space	109.0					
drive-ins (seating & parking)	gpd/seat	40.6					
conventional restaurants	gpd/seat	24.2	55.2	83.4	114	167	198

(continued)