



*Stow Lake*

# Utilities and Infrastructure

## Utilities and Infrastructure

The utilities and infrastructure that support the recreation activities in Golden Gate Park are largely hidden and unnoticed, but without them the park could not function. Many of these services, including electrical, water supply and distribution, and sewers date from the early part of this century and some from the last century. These systems are antiquated and in very poor condition. Some require expensive ongoing maintenance to keep them functioning and some present safety hazards.

The 1992 Golden Gate Park Infrastructure Bond, approved by San Francisco voters, provides over \$70 million for the reconstruction of the park's utilities and infrastructure. The construction work, which will occur over ten years, is being planned to minimize disruption of park activities. Work is organized to comprehensively upgrade all utilities at one time in each park area to limit disturbances. Construction activities are also being planned to minimize impacts on wildlife and natural systems.

The existing utility systems have had a long and useful life. The replacement systems to be installed are also designed for long life and some will provide significant savings in lower maintenance costs that can be used for other park needs.

## Water System

The park's water system makes possible the verdant landscape we see today. Much of the existing water system was constructed over 75 years ago and has problems including insufficient water supply and water pressure, and sediment in the water from old wells, pumps, and pipelines. The park's internal water system for irrigation and lakes is fed from park wells, and serves approximately two-thirds of the park. The other areas of the park have municipal water service, metered from Fulton Street or Lincoln Way. Drinking water in the park is from municipal water. A productive aquifer lies within the sands beneath the park. The development of the park's own water system was spurred by the City's dispute with the Spring Valley Water Company over high water charges in the early years of the park. The park's system has been an economical source of high quality water for the park's irrigation and lake needs.

Much of the existing water system is in poor condition due to its age. The existing water system consists of the following components:

- **Wells and Pumps.** There are seven wells and pumps, of which six are currently active with a capacity to produce 3,750 gpm (gallons per minute). Only one of the wells, Elk Glen (1982), is a major producer in good condition. The Alvord well is relatively new (1984) but has relatively low production. The other wells, which are between 50 and 70 years old, are probably in poor condition due to their age and corroded casings. Many of the pumps are also very old and reaching the end of their useful lives.

- **Reservoirs.** There are three concrete-lined reservoirs (North Mill, Strawberry Hill, and Waterworks) with a combined storage capacity of 890,000 gallons. The largest of these, the Strawberry Hill reservoir, is small and in poor structural condition in the event of an earthquake. Elk Glen Lake and Stow Lake are also used for water storage, although only a small portion is available for irrigation use. The primary problems are a lack of storage capacity to serve some areas of the park. Gravity flow also results in low water pressure in some areas.
- **Distribution System.** The main water pipelines consist of cast iron pipe with caulked joints in diameters of four inches and larger, and galvanized steel pipe in diameters of smaller than three inches. The iron pipe is in fair condition, but the galvanized steel pipe is badly corroded and requires replacement. There may be considerable leakage from caulked joints. Many of the valves are old and in poor condition, and many pipelines are undersized for projected needs. There are no accurate maps of the existing water pipelines.

### Water Consumption

The total park irrigation need is estimated to range between 1.5 mgd (million gallons per day) during low use periods, to 4.0 mgd during high use periods. Currently, two-thirds of water used is supplied by well water, and one-third by municipal water. It is estimated that, if run continuously, the seven existing wells could produce a daily yield of 5.4 mgd. The current use of municipal water is a result of the lack of a storage and distribution system in some park areas, and the need to reconstruct wells, rather than a lack of potential well water supply.

**Water Supply System Master Plan**

The majority of funds from the 1992 Golden Gate Park Infrastructure Bond will be used to rebuild the park's water system. A master plan has been developed to guide the reconstruction of the water system. The plan is based on the following primary design criteria:

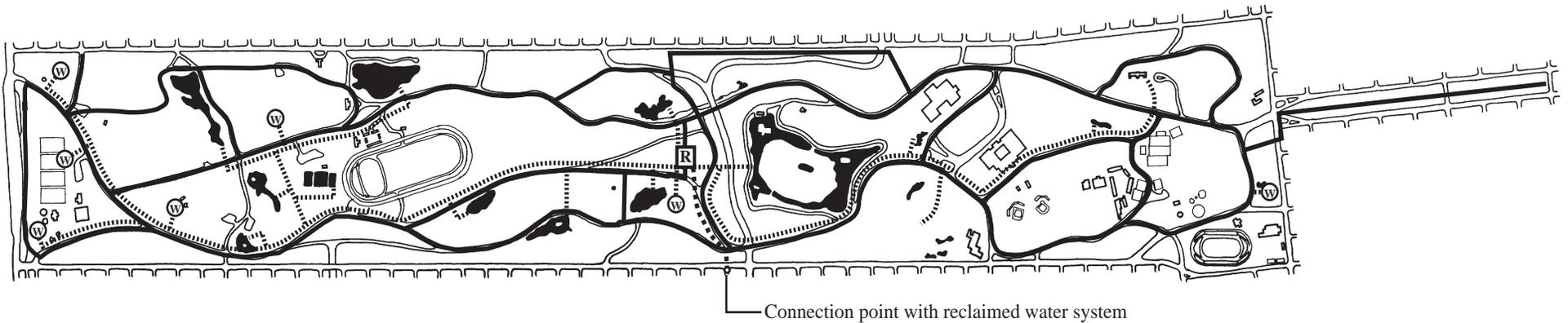
- low maintenance and operation requirements
- simplicity of operation and maintenance
- dependable supply of clean, high pressure water for irrigation and lakes
- flexibility to utilize well water and/or reclaimed water as a supply source

- the system should have a useful life of 50 to 100 years
- compatibility with the Golden Gate Park Master Plan
- minimum disruption of the park, and the existing irrigation system, during construction.

The proposed irrigation and lake water system divides the park at Transverse Drive into two water pressure zones due to the elevation difference between the eastern and western ends of the park. A central pumping plant will be constructed near the composting area which will

supply all the pressurized water for park irrigation and will accommodate the use of both well water and reclaimed water. Replacement wells will be constructed primarily in the western area of the park and will pump directly to a central, covered storage reservoir which will be adjacent to the central pumping plant. The primary irrigation pipeline system will distribute well water or reclaimed water. A secondary pipeline system will be provided for distribution of well water only for use in lakes and for irrigation of sensitive plant areas.

**Proposed Irrigation and Lake Water Supply System**



**Legend**

- ..... Nonpotable irrigation (well water only)
- Nonpotable irrigation (well water and/or reclaimed water)
- ..... Reclaimed water supply connection
- Ⓜ New or existing well
- Ⓜ Central pumping plant and new reservoir

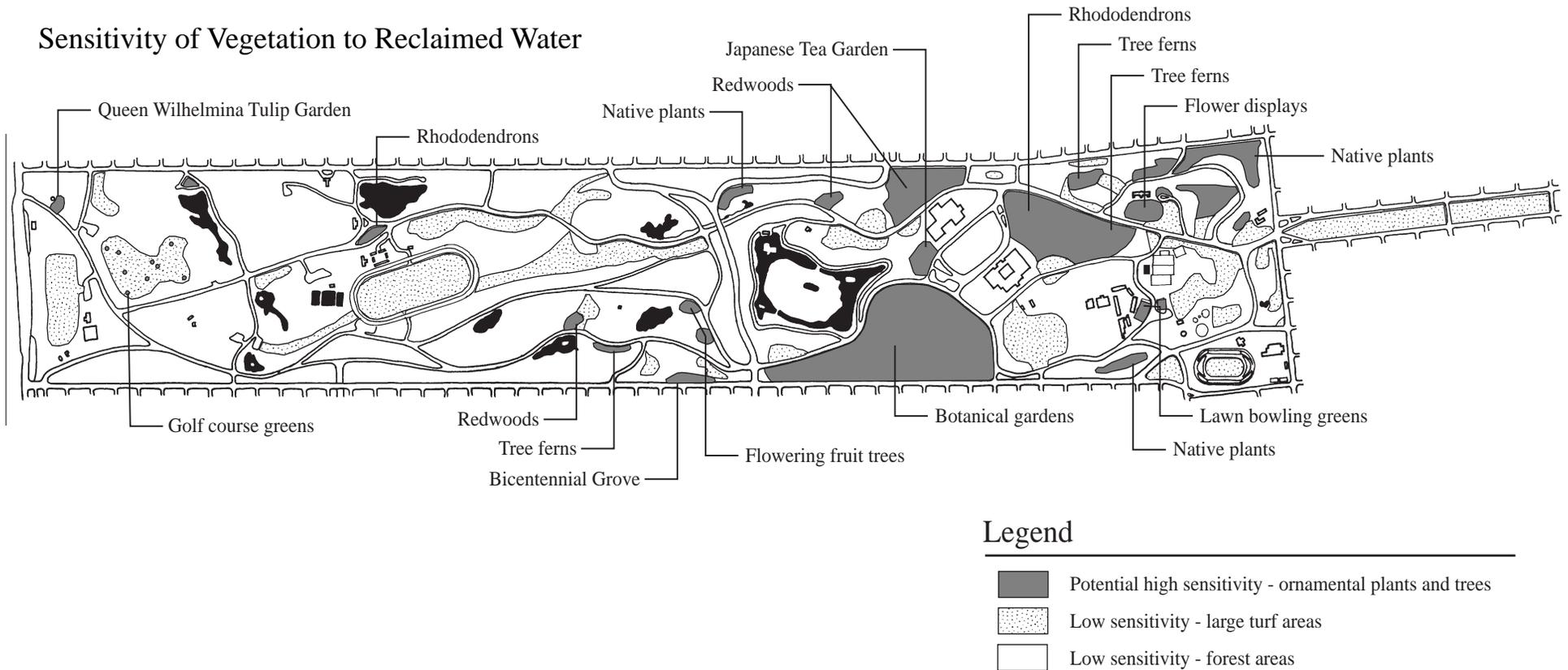
**Use of Reclaimed Water**

San Francisco is planning for the use of reclaimed waste water. A tertiary treatment plant is proposed in the western part of the city, which could provide a supply of reclaimed water for appropriate uses in Golden Gate Park and elsewhere. Reclaimed water, although completely safe for human contact, may contain some compounds (including salts) that, in high concentrations, can be damaging to some plants. The high organic content of reclaimed water

may also promote the growth of algae in lakes and impair water quality. Plants that may be sensitive to reclaimed water include many ornamental plants, rhododendrons, redwoods, and other acid-loving plants. Large portions of the park have plants with low sensitivity to reclaimed water, including turf areas and forest areas (except oaks and redwoods). The map of Sensitivity of Vegetation to Reclaimed Water shows areas suspected to have a high sensitivity to reclaimed water and areas expected to have

low sensitivity. The detrimental properties of reclaimed water may also be mitigated by alternating with periods of well water irrigation to leach offending compounds out of the soil and wash off of foliage. The proposed water system offers the flexibility to use only well water in some areas, and use reclaimed water or well water in other areas. The lake supply system will remain on well water.

**Sensitivity of Vegetation to Reclaimed Water**



## Sewer System

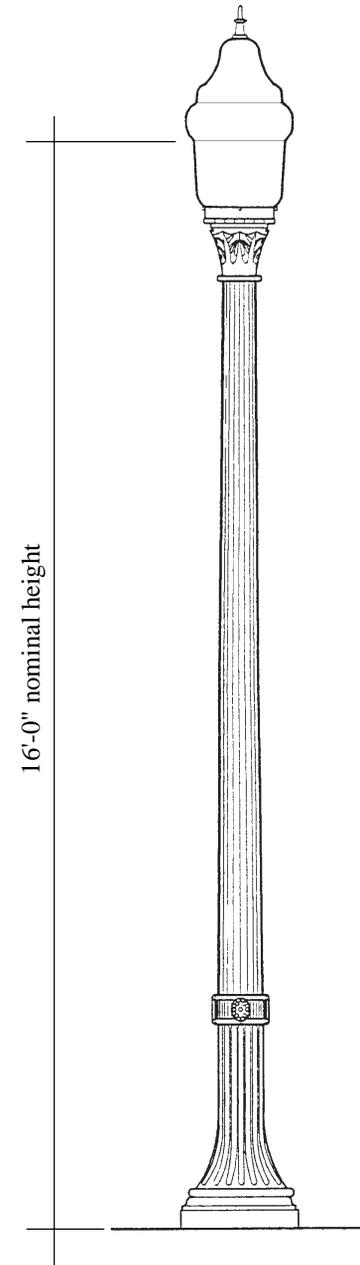
The Department of Public Works has prepared a Sewer Master Plan to guide upgrading of the park's sewer system. Existing sewers have been analyzed and will be re-sized to adequately handle the sewage and drainage needs. Construction of sewers will be coordinated with other underground utilities to minimize disruptions in the park.

## Electrical System

As part of the 1992 Golden Gate Park Bond infrastructure work, the electrical power supply systems in the park have been evaluated and an Electrical Master Plan for upgrading and renovating these systems has been developed.

There are more than forty separate electrical power supplies to various locations throughout the park. Many of these systems were installed over half a century ago and need to be replaced or upgraded to comply with the existing National Electrical Code. Other services have been recently installed or upgraded and will need no further work.

A detailed study of each of the power supplies was conducted and recommendations were developed based on the needs of each area. These areas were prioritized and will be coordinated with the Pacific Gas & Electric Company to develop plans for the design and renovation of the electrical systems. Renovation of these systems will be coordinated with other underground utilities in the park to minimize construction disruptions. Replacement or upgraded electrical services that will be part of the 1992 GGP infrastructure bond work include service to the replacement water wells, the irrigation water supply pump station, park lighting system, and any other replacement facilities.



## Park Lighting

The existing lighting system in the park is antiquated and in need of replacement. Pedestrian scaled replacement lighting is proposed for selected paths and roads to provide a minimum safety "beacon" lighting system. The proposed lights would consist of an acorn-style luminaire on a traditional pole (approximately 16' high). The luminaire would likely be color corrected high pressure sodium (150, 100, or 70 watt) which is the most energy efficient for outdoor lighting. The light is similar to lights used elsewhere in San Francisco, including those on the Embarcadero project.

Different areas of the park will be lighted to different levels based on amount of use and safety considerations. Lighting is for safety purposes and is not intended to increase night use.

The proposed park lighting is divided into the following priority levels:

Highest priority/lighting level:

- pedestrian night use areas (including connections between evening activity areas, parking, and Muni stops)
- pedestrian/vehicle/bike intersections
- roadways with heavy night use

Medium priority/lighting level:

- pathways to night use areas
- roadway intersections
- selected park roads

Low priority/minimum lighting level:

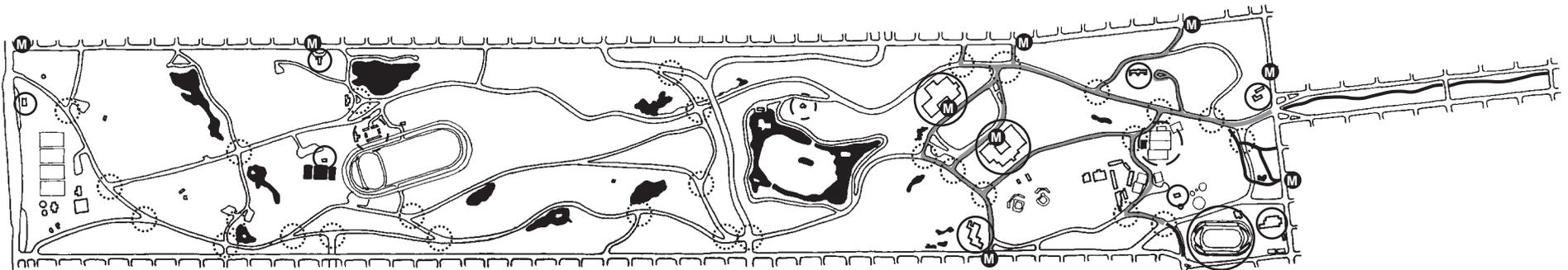
- all other park roads (this level provides minimal lighting between fixtures, but the next "beacon" light can be seen from roadways)

Night use areas include:

- McLaren Lodge
- Kezar Pavilion
- Kezar Stadium
- Sharon Building
- Conservatory
- Academy of Sciences
- deYoung Museum/Asian Art Museum
- County Fair Building
- Senior Center
- Beach Chalet
- Angler's Lodge

Potential night use areas:

- Tennis courts
- Pioneer Log Cabin
- Equestrian center



### Legend

- |   |   |   |   |
|---|---|---|---|
| ○ | Night use areas                           | — | Primary access roads and adjacent paths to night use areas (highest priority) |
| ⋯ | Potential night use areas                 | — | Path access to night use areas (highest priority)                             |
| ⋯ | Important intersections (medium priority) | Ⓜ | MUNI stops serving night use areas  |